

BASUTOLAND

ANNUAL REPORT

DEPARTMENT OF AGRICULTURE

For the Report Year ended 30th September, 1939.



BASUTOLAND.

Annual Report of the Department of Agriculture For the Report Year Ended 30th September, 1939.

The Annual Report of the Department of Agriculture is divided into three divisions:—

- (1) Agriculture.
- (2) The Engineering Section, Anti-Soil Erosion and Irrigation Works.
- (3) Veterinary and Livestock.

The staff operating the three divisions and the details of the work performed are given in the divisional reports.

The Administrative Staff and a few general questions of policy and aspects of the work are dealt with in this covering report.

ADMINISTRATIVE STAFF.

EUROPEAN:

- R. W. Thornton, C.B.E., Director of Agriculture.
E. D. G. P. Heering, Accounting Clerk.
R. F. S. Heering, Clerk.
Miss M. Cumberlidge, Lady Clerk and Typiste.
Miss G. D. Raymond, Lady Clerk and Typiste.

NATIVE:

Three Clerks.

ORGANISATION AND POLICY.

The organisation and general policy of the Department, which were detailed in the 1937 Annual Report, have been steadily pursued throughout 1938 and 1939.

AGRICULTURAL AND LIVESTOCK PROJECTS.

The nine major projects which have primarily engaged the Department's attention since their inception are being pressed forward on an ever-expanding scale, as is clearly indicated in the attached Divisional Reports. Most of these projects were drawn up late in 1935; were approved in 1936, and brought into operation at the end of that year or early in 1937.

The nine projects referred to in the preceding paragraph are —

- (1) Direct Anti-erosion Work.
- (2) Pasture Management.

- (3) Crop Improvement.
- (4) Terraced Vegetable and Fruit Gardens.
- (5) Merino Sheep Improvement and Wool Classing.
- (6) Cattle Improvement.
- (7) Equine Improvement.
- (8) Livestock Markets.
- (9) Produce Markets and Commercial Agricultural Shows.

The three reasons for undertaking these nine major works; the policy governing procedure; the objects to be attained and the progress made towards the attainment of the objects aimed at, were dealt with at considerable length in last year's report.

The excellent progress made during the year under review, as compared with the previous year, is shown in the attached Divisional Reports, and further comment is only necessary in connection with two items, namely, Pasture Management and Wool Classing.

(1) PASTURE MANAGEMENT.

The full progress desired in connection with this difficult and far-reaching project was not achieved due to several causes, the chief of which were the protracted illness and subsequent death of the Paramount Chief, and the Director of Agriculture's absence on leave for a period of seven months. Fortunately the delay caused has not done any harm. This is due to the good pasture season which occurred. In fact the delay has not been unfruitful, as the examination of experimental results, etc., has led to a close re-examination of the original proposals, which will result in a further simplification of the general plan dealing with pasture control throughout the territory.

(2) WOOL CLASSING.

The Principal Veterinary Officer's Report shows that outstanding progress was achieved in wool classing.

DIRECT ANTI-EROSION WORK.

The remaining difficulties which exist and which hamper the full prosecution of the anti-erosion campaign, were enumerated in the Engineering Section of last year's report. The position in respect of some of these has improved and it is hoped that they will shortly all be disposed of satisfactorily by the Paramount Chief who has them under consideration at the present time. The most striking instance of the decline of an outstanding difficulty is that which occurred in connection with the anti-tree planting spirit. To-day in most areas it is not a case of the Department begging for permission to plant trees in very badly eroded areas, but of the Natives offering these areas for tree-planting, and it only remains now to make this question universal in its application.

CONCLUSION.

It is desired in this report to record my thanks and appreciation to all those who have supported the work, and particularly to my staff for their sustained effort and enthusiasm.

(Sgd.) R. W. THORNTON,
Director of Agriculture.

VETERINARY AND LIVESTOCK DIVISION.

PART I.

STAFF.

1—EUROPEAN STAFF.

- G. T. Henderson, M.R.C.V.S., Principal Veterinary Officer.
 W. S. B. Clapham, B.V.Sc., Assistant Veterinary Officer.
 N. O. Halse, Agricultural & Livestock Officer, Mohale's Hoek.
 G. H. Larkan, Agricultural & Livestock Officer, Mafeteng.
 P. M. Wilhelm, Assistant Agricultural & Livestock Officer,
 Qacha's Nek.
 H. L. van Vuuren, Assistant Agricultural & Livestock Officer,
 Teyateyaneng.
 G. R. Chalmers, Assistant Agricultural & Livestock Officer,
 Maseru.
 J. G. S. Bennie, Assistant Agricultural & Livestock Officer,
 Mokhotlong.
 P. B. Connellan, Assistant Agricultural & Livestock Officer,
 Butha Buthe. (On probation.)

2—NATIVE STAFF.

Clinical Branch.

- 2 Veterinary Assistants (Grades II and IV respectively).

Field Branch.

- 3 Stock Inspectors (Grade III).
 1 Stock Inspector (Grade IV).
 59 Assistant Stock Inspectors (Grade V).
 7 Clerks (Grade IV). (These men are also charged with
 certain field duties.)
 16 Pack Grooms (ungraded).

Stud Branch.

- 2 Stud Grooms (Grade IV).

Central Pack Stables.

- 4 Pack Grooms (ungraded).

3—ADMINISTRATION.

The headquarters of the division is at Maseru, and the postal address is Post Office Box 24, Maseru.

4—FINANCE.

The total Veterinary Vote for the financial year ending 31st March, 1940, is £21,382. (For details see Part IV.)

5—EUROPEAN STAFF. (Movements and Changes.)

The Assistant Veterinary Officer mentioned in last year's report was transferred to Basutoland from the Union Government and assumed duty in Maseru on the 16th September, 1939.

The Agricultural and Livestock Officer at Butha Buthe was retired on pension on the grounds of ill-health, and the vacancy thus created was filled by the promotion of an Assistant Agricultural and Livestock Officer.

Two officers were promoted from "Assistant Agricultural and Livestock Officer" to "Agricultural and Livestock Officer."

6—NATIVE PERSONNEL.

Twenty-nine members of the field staff obtained wool classing certificates, having duly passed the requisite tests.

7—CLINICAL STATION.

The total revenue derived from the Clinic during the year was £213 16s. 8d., compared with £163 7s. 1d. in the previous year.

A table is appended showing the number of animals treated during the year at the Clinic:—

EQUINES.		CATTLE.		DOGS.		CATS.	
Operations.	Treated.	Operations.	Treated.	Operations.	Treated.	Operations.	Treated.
267	2,311	264	379	10	220	13	45

Cattle inoculated at the Clinic and elsewhere for:—

Anthrax.		Anaplasmosis.	Quarter Evil.
Clinic	7,101	390	497
Dist. Offices	20,576	4,588	3,273
Total	27,677	4,978	3,770

8—CENTRAL PACK STABLES AND DISTRICT ESTABLISHMENT.

The centralisation of equine pack animals at the Central Pack Stables, Maseru, which was inaugurated three years ago, has proved both an efficient and economical scheme. This depot is the only one of its kind in Basutoland and caters for the needs of all Headquarters' Officials and for those in the Maseru District, except the Maseru Police.

The numerical strength of the pack establishment is now 24, viz., 8 horses and 16 mules.

Thirty-three treks were catered for.

With the exception of a few minor injuries, no major casualties occurred during the year.

The Agricultural Officers in all other districts continue to maintain their own separate establishments, details of which follow:—

The following pack animals are on charge to officers of the district administration:—

Horses.	Mules.	Donkeys.
7	26	60

9—REGISTRATION OF PRIVATELY-OWNED EQUINE TRANSPORT.

Every equine owned and used by officials in the service of the Government has now been registered in terms of High Commissioner's Notice No. 12 of 1937, and amending regulations.

Approximately 200 equines have been registered in the Department since the inauguration of the scheme, over two years ago. Sixty-three equines have been written off, viz:—

Disposed of by owners and replaced by better animals	24
Retained by owners who left the Service . .	17
Died in the service of the Government and compensation paid to the value of £94 . .	17
Redundant animals taken over by the Government and compensation paid to the value of £69 10s.	5
Total . .	63

10—CENTRAL STUD STATION, MASERU.

Owing to increased demands it was found necessary to augment the number of stallions standing at stud from three to four. The central stud now consists of the following:—

Name of Sire.	Pedigree.	Purchase Price.	Financial Year Purchased.
"Landing"	Dignitary—Ashore	£105	1929/30
"Dark Warrior"	Happy Warrior—		
	Othello's First	£60	1937/38
"Seeker"	Illustrious—The		
	Quest	£40	1938/39
"Ritual"	Cross Bow—Rite	£40	1939/40

The services of a Catalonian donkey "Jack" have also been secured for the central stud stables, the purchase price being £35.

The number of mares served by stallions at the central stud, Maseru, during the year was 174; of these 137 were Native owned and 37 European owned. Of the 37 European owned mares referred to, 18 were owned by Europeans resident outside the territory.

The revenue derived from the stud during the year amounted to £200 10s. 0d.

The following figures indicate the increasing popularity of the stud:—

Report Year	Number of mares owned by		Revenue Collected.
	Natives.	Europeans.	
1935/36	52	27	£70 5 0
1936/37	112	15	£74 15 0
1937/38	107	31	£151 0 0
1938/39	137	37	£200 10 0

The tariff of stud service fees laid down is:—

	£	s.	d.
Native residents of Basutoland	0	10	0
Natives resident outside the territory ..	5	0	0
European residents of Basutoland	2	0	0
Europeans resident outside the territory	5	0	0

11—EQUINE IMPROVEMENT SCHEME.

Details of this project appeared in the report for the year 1936/37. There are two divisions, viz.: (a) Central Stud Station, Maseru, and (b) Field Division. Details of the Central Stud Division appear above.

The following table shows (a) the number of animals purchased; (b) the purchase price; (c) the number of animals sold and the prices realised; and (d) the mortality up to 30th September, 1939.

Financial Year.	Total Purchases.		Amount paid less landing and other costs.		Deaths Recorded.		Sold to Custodians.		On Hand.		Amounts Realised by sale.		Loss by Death.	
	Stallions.	Jacks.	Stallions.	Jacks.	Stallions.	Jacks.	Stallions.	Jacks.	Stallions.	Jacks.	Stallions.	Jacks.	Stallions.	Jacks.
1929/30 ..	1	—	£105 0 0	—	—	—	—	—	1	—	—	—	—	—
1936/37 ..	—	2	—	£38 10 0	—	—	—	—	1	2	—	—	—	—
1937/38 ..	22	5	£625 0 0	£140 0 0	1	1	3	—	19	6	£90	—	£20	£30
1938/39 ..	12	13	£408 6 0	£377 10 0	—	—	—	—	31	19	—	—	—	—
1939/40 ..	12	12	£455 0 0	£370 0 0	—	1	—	—	43	30	—	—	—	£40
Totals ..	47	32	£1,593 6 0	£926 0 0	1	2	3	—	95	57	£90	—	£20	£70

It will thus be seen that under the Equine Improvement Scheme, 12 stallions and 12 donkey "Jacks" were introduced during the financial year 1939/40.

The policy of resale referred to in last year's report was reviewed, and it has now been laid down that no Government owned stallion or "Jack" may be sold to Native breeders of horses or mules until such animal has completed three years' service in the territory.

During the period 1/8/38—30/9/39, 435 mares were served by Government owned stallions and 27 horse mares by Government owned "Jacks." These figures do not include the stallions and "Jacks" introduced during the financial year 1939/40, as most of these are only commencing service this spring. It will be recalled that horse stallions and donkey "Jacks" are loaned by the Government to approved reputable Native residents of Basutoland, who are recognised as breeders and possessors of good quality mares. The selected custodians have to sign an agreement embodying certain conditions covering: (i) the care and management of the loaned animals; (ii) the registration of selected mares and progeny; (iii) the retention in the territory of certain registered colts, progeny of the matings. Custodians are not permitted to retain a scrub stallion. They are authorised to serve their own mares free, but to charge patrons of the stud a service fee of 10/- per mare, which fee goes to the custodian to cover costs of erecting suitable stabling and to provide proper feeding, etc. By this means it is hoped to eliminate, in the course of time, many undesirable stallions and to replace these by the progeny of the imported sires and selected mares.

The lucerne seed issued to custodians of Government-owned sires and "Jacks," to augment the fodder supplies of barley, oats, etc., for feeding the animals committed to their care, has proved most useful.

12—CATTLE IMPROVEMENT SCHEME.

Mention was made in the 1937/38 Report of the measures adopted to improve the cattle of the territory. These may be enumerated briefly as follows:—(a) Prohibition by law of undesirable bulls entering Basutoland. (b) The erection of eight bull camps at widely separated sites in the territory and the stocking of these with bulls of the Afrikaner and Sussex breeds. (c) The purchase and introduction of bulls of the Afrikaner and Sussex breeds for distribution on loan to approved breeders. (d) Persuading the Natives to emasculate Scrub Bulls. (e) The declaration of ports of entry for cattle, where "culling" operations are carried out on fixed days by officers of the department.

Each bull camp is approximately 100 acres in extent, with a carrying capacity of 100 selected cows. Bulls of the Afrikaner and Sussex breeds are purchased annually by the Government for distribution on loan to approved reputable Native residents of Basutoland who are recognised as reliable cattle breeders. The selected custodians have to sign an agreement covering a period of two years. The agreement embodies certain conditions regarding the care and management of the loaned animals, the registration of selected cows and selected male progeny, and refusal to accept cows for service if the owner has a "scrub" bull in his possession. Custodians may not possess a "scrub" bull. Custodians are authorised to serve their own cows free but to charge patrons of the stud a service fee of one shilling

per cow, which fee he retains to cover costs of upkeep, etc. By this means it is hoped that in the course of time many undesirable bulls will be eliminated and replaced by better bulls, the progeny of the imported bulls and selected dams already referred to.

During the year under review the Government purchased 56 pure bred bulls (52 Afrikaner and 4 Sussex) for distribution under the scheme outlined above. Emasculation was steadily continued throughout the year on the basis of moral persuasion and also in accordance with the conditions under which bulls are loaned. As a result 3,532 undesirable bulls were emasculated by members of the Agricultural and Veterinary staffs, viz.:

By members of the Agricultural Staff 870

By members of the Veterinary Staff 2,712

These figures do not include many hundreds of bull calves which were castrated by the owners themselves.

The declared ports of entry into Basutoland and the days fixed for introduction and inspection by officers of the Department, are shown below.

Port of Entry.	Inspection Days.
Maseru Bridge	Wednesdays.
Van Rooyen's Gate	Saturdays.
Makhaleng Bridge	Wednesdays.
Telle Bridge	Saturdays.
Qacha's Nek Gate	First Saturday in each month.
Ramats'eliso's Gate	First Monday in each month.
Namahali Pass	Here inspection is carried out by border guards.
Caledon Poort Bridge	Saturdays.
Ficksburg Bridge	Thursdays.
Peka Bridge	Tuesdays.

As cattle may only enter Basutoland by way of declared ports of entry, this system has the following advantages: it prevents unrecorded female cattle entering the territory, facilitates inspection and ensures that all cattle passed for entry are inoculated against anthrax. With the exception of those entering via Namahali Pass, each port of entry is equipped with a crush pen for this purpose.

A culling demonstration was held at Maseru in September, 1938, and this was attended by all members of the staff. The object of the demonstration was to define a standard type of animal which traders, speculators and livestock dealers may be permitted to introduce and thus protect the interests of the Native cattle-man who will ultimately become the owner by barter, purchase, or exchange of the cattle introduced. Unfortunately this scheme has not proved the success anticipated, for the reason that the "culls" are disposed of across the border to Native clients from Basutoland, and eventually reach the territory in small numbers as Native owned stock. To overcome this difficulty it will be necessary to resort to other measures, and this question is receiving attention.

The following tables show the distribution of bulls and other details of interest.

BULL CAMP SCHEME.

Site.	District.	Year Intro- duced.	Breed. Afrik. Sussex.	Mortality. Afrik. Sussex.	Total in camp as at 30/9/39.	Total Cows Served 1937/38 1938/39
Matsieng . . .	Maseru	1936/37	2	—	2	50 43
Hlotse Camp . .	Leribe		2	1	3	112 124
Tsime	Butha Buthe . .		3	—	3	64 114
Sehlabathebe . .	Qacha's Nek . .		3	—	3	24 63
Malimong . . .	Berea		3	1	4	85 107
Moholobela's . .	Mafeteng		2	1	2	56 58
Maputseng . . .	Mohale's Hoek . .		3	1	4	24 58
Sempe's	Quthing		3	—	3	33 21
Totals			21	4	24	448 588

DISTRIBUTION ON LOAN SCHEME.

District.	Financial Year Intro- duced.	No. of Bulls loaned.	Breed.		Cows Served.	Financial Year Intro- duced.	No. of Bulls loaned.	Breed.		Cows Served.	Mortality		Total on hand.
			Atrik.	Sussex.				Atrik.	Sussex.		Atrik.	Sussex.	
Maseru	1938/39	5	5	—	63	1939/40	11	11	—	—	1	—	15
Mafeteng	"	5	5	—	36	"	5	5	—	—	—	—	10
Mohale's Hoek . .	"	6	5	1	74	"	6	4	2	—	—	—	12
Quthing	"	5	5	—		"	6	6	—	—	—	—	11
Qacha's Nek . .	"	6	3	3	79	"	9	8	1	—	—	2	13
Mokhotlong . .	"	4	4	—	12	"	6	5	1	—	1	—	9
Butha Buthe . .	"	3	3	—	30	"	4	4	—	—	—	—	7
Leribe	"	7	5	2	45	"	8	8	—	—	—	1	14
Berea	"	3	3	—	41	"	1	1	—	—	—	—	4
Totals	"	44	38	6	*380	"	56	52	4	—	2	3	95

* NOTE.—The small number of cows served is due to the fact that the bulls are very young.

13—CATTLE (European owned).

The number of European owned cattle in the territory remained practically the same as in the previous year. As these cattle are kept for domestic purposes only, popular milking breeds such as the Jersey, Friesland, Ayrshire and Shorthorn, are favoured.

There are no European farmers, and cattle dipping is not carried out. There are, however, two cattle dipping tanks in the territory, viz.: one at Maseru and one at Qacha's Nek, but these are not in commission at present. Steps are to be taken to erect a spraying outfit at Maseru in order to cope with tick life on the Reserve.

The Government owned dairy herd at the Botsabelo Leper Institution Farm is now predominantly Friesland.

CATTLE (Native owned).

As already indicated, certain measures have been introduced which are calculated to improve the Native herds of Basutoland for milk and beef production and for draft purposes. There is a steady demand for Basuto trek oxen as farmers in the Union hold these in high esteem. In some districts in Basutoland, however, there is a dearth of mature trek oxen, and one often sees mixed spans of young oxen, cows and bulls used for ploughing purposes in the fields.

The following table shows comparative figures for the report years 1935/36, 1936/37, 1937/38 and 1938/39 in respect of cattle, also imports and exports:—

1935/36.			1936/37.		
Census.	Imports.	Exports.	Census.	Imports.	Exports.
414,872	6,995	9,913	418,921	11,746	8,477

1937/38.			1938/39.		
Census.	Imports.	Exports.	Census.	Imports.	Exports.
434,990	12,073	5,544	447,763	15,262	6,562

A classified cattle census was taken during the year. The following table shows the comparative figures for the report years 1937/38 and 1938/39.

1937/38.				1938/39.			
Bulls and Bull Calves.	Cows and Heifer Calves.	Oxen	Total	Bulls and Bull Calves.	Cows and Heifer Calves.	Oxen	Total
55,134	231,296	148,560	434,990	76,257	228,982	149,524	447,763

The ratio of bulls to females is still far in excess of that considered adequate.

14—CATTLE EXPORT AND BARTER TRADE.

(a) Slaughter Cattle.

There is practically no export trade in slaughter cattle.

(b) Trek Oxen.

As already pointed out, many trek oxen leave the territory annually. These are either purchased outright by Union farmers or by speculators who acquire them by exchange. In the latter case tollies are exchanged for oxen on the basis of two tollies for one ox. In this manner an extensive trade is done to the temporary detriment of the ox transport service of the country.

15—PREPARATION OF HIDES FOR THE MARKET, TOGETHER WITH EXPORT FIGURES.

With the exception of hides cured by traders, butchers and the Farm Bailiff at the Botsabelo Leper Institution Farm, 35% of hides are still classified as ungradeable. The average quality of the gradeable hides, flayed and cured by Native farmers, is given as follows:—

First quality	..	..	..	35%
Second quality	..	..	..	15%
Third quality	..	..	..	15%

At the present time the vast majority of Basutoland hides are produced from carcasses which are flayed on the veld. The hides are sold by the Native farmers to the local trading centre. These are either cured by sun-drying before selling or, in cases where the trading centre is nearby, sold in the green state and cured at the trading centre by salting or sun-drying.

The low quality of hides produced in Basutoland by Native farmers is due mainly to bad flaying, faulty curing and faulty preservation. Other faults which occur are:—

- (a) Horn-rakes,
- (b) Brand marks.
- (c) Whip marks,
- (d) Bed sores.
- (e) Damage from parasitic skin diseases.

16—EXPORT OF BONES.

The bone sterilising factory referred to in last year's report was erected in April, 1939, and as a result 380,778 lb. weight (net) of sterilised bones were exported from the factory to the Union up to 30th September, 1939.

17—PROPHYLACTIC INOCULATION AGAINST ANTHRAX IN CATTLE.

Owing to the improved position in regard to the incidence of anthrax, a universal inoculation of cattle is not carried out. Protective inoculation against this disease is now confined to infected and contact areas and to imports and exports.

All cattle in infected and contact areas are inoculated bi-annually. The Union Government supplies the vaccine at the rate of 5/- per 100 doses. Inoculations are carried out free by

members of the Agricultural Department and the Basutoland Mounted Police, excepting in the case of traders and livestock speculators importing cattle, when a charge at the rate of 10/- per 100 doses is made. All cattle entering and leaving the territory are inoculated by Basutoland Government officials immediately prior to entry or exit, and for this purpose crush pens have been erected at the following declared ports of entry and exit:—

1. Maseru.
2. Van Rooyen's Gate.
3. Makhalleng Bridge.
4. Telle Bridge.
5. Caledon Poort Bridge.
6. Ficksburg Bridge.
7. Peka Bridge.
8. Sani Pass.
9. Qacha's Nek.
10. Ramats'eliso's Gate.
11. Bushman's Nek.

Only three outbreaks of anthrax, involving the deaths of three cattle, were detected during the year as compared with four outbreaks during the previous year.

19—GENERAL.

As pointed out in previous reports, grazing in the lowlands is becoming increasingly limited due to intensive cultivation. There is, of course, plenty of grazing in the highlands where cultivation is not carried out on such an intensive scale. The highlands maintain most of the cattle population during the spring, summer and early autumn, but in spite of this at certain periods, such as the ploughing season, the problem of limited grazing in the lowlands becomes acute, and during the winter months, due to severe cold and snow in the mountains, the lowlands are flooded with cattle brought back from the highlands, and these are entirely dependent upon maize stalks for sustenance.

Owing to fairly well distributed though not abnormally heavy rains during the summer, there was good grazing and a fair quantity of maize stalks in the fields, consequently cattle fared well during the winter which was comparatively mild in the lowlands.

Favourable rains during the months of August and September provided a certain amount of early grazing, consequently cattle maintained their condition fairly well in most areas, although there was mortality from starvation in certain localities.

The average rainfall for the year was 29.07 inches, compared with 25.55 inches during the corresponding period of the previous year.

20—SMALL STOCK.

(a) Sheep Improvement Scheme.

During the year under review 504 high quality, young merino rams of breeding age and carrying long wool were purchased by the Government from eminent sheep breeders in the districts of Graaff-Reinet, Hanover and Middelburg, Cape Pro-

vince. The purchase price of the rams ranged from £2 to £3. The rams were distributed direct from the producers' farms to the various districts in Basutoland for resale by officers of the Agricultural Department to approved Native breeders at prices ranging from £2 5s. 0d. to £2 10s. 0d. The sheep carry long wool so that this factor, coupled with their excellent quality and youthfulness, make them not only attractive but an excellent bargain, and consequently they command a ready sale. The purchaser benefits in two ways, namely, he gets a high quality ram at a price lower than cost, and a fleece of long wool which will reduce his initial outlay by approximately 25%.

A table is appended showing the number of rams purchased since the inauguration of the scheme, the mortality, the number of rams sold, the number donated and the total on hand as at 30th September, 1939. Later in this report mention is made of further measures to improve the health and quality of the sheep population.

RAM RETURN.

Financial Year.	No. of rams purchased.	No. of rams sold.	Mortality.	No. of rams donated.	Total on hand as at 30/9/39.
1935/36 ..	666	626	34	6	nil
1936/37 ..	307	248	54	3	2
1937/38 ..	290	282	8	nil	nil
1938/39 ..	484	436	21	nil	27
1939/40 ..	504	nil	nil	nil	504
Total . . .	2,251	1,592	117	9	533

(b) Wool Classing Scheme.

Mention was made in last year's report of arrangements having been made to give official wool classing demonstrations for the benefit of the trading community. Three such demonstrations were conducted at different centres. The demonstrations were well attended, and the Government received many tributes from leading traders for the opportunities afforded them.

The territory is now well equipped with stationary shearing sheds, of which there are 10 at widely separated sites. These are augmented by 25 portable shearing outfits which operate in the mountains. The following table shows the distributions of the sheds and portable shearing outfits:—

STATIONARY SHEDS.		PORTABLE SHEARING OUTFITS.		
District.	Site.	Num-ber.	Veterinary Area.	Num-ber.
Maseru	Maseru Reserve	1	No. 1	5
Mafeteng	Mafeteng Reserve	1	No. 2	4
Mohale's Hoek..	Mohale's Hoek Reserve ..	1	No. 3	3
Quthing	Quthing Reserve	1	No. 4	4
Qacha's Nek ..	Sehlabathebe	1	No. 5	3
Qacha's Nek ..	Ramats'eliso's	1	No. 6	3
Butha Buthe ..	Butha Buthe Reserve .. .	1	No. 7	3
Leribe	Leribe Reserve	1		
Leribe	Peka	1		
Quthing	Chief Sempe's Village ..	1		
Total		10	Total	25

Comparative tables are appended showing the quantities of wool classed into the various lines by officers of the Division since the inception of the scheme two years ago.

WOOL CLASSING RETURN.
Period September, 1937, to April, 1938, for the whole territory.
Various Classes and Weight in lbs.

Veterinary Area.	No. of flocks.	No. of sheep.	Comb- ing.	Shorts.	C. & C. & XM.	H.	L.L.	L.	BUR.	CBP.	BP.	BKS.	LOX. Lines.	Other Weight of wool.
Butha Buthe	62	6,394	8,078	6,135	4,528	—	366	—	—	—	3,812	—	1,925	24,844
Teyateyaneng	34	2,381	513	2,680	1,698	—	466	277	—	44	927	—	1,127	7,732
Maseru	88	4,509	3,628	7,135	2,900	—	381	303	—	91	283	—	3,961	18,682
Mafeteng	118	11,871	10,973	15,537	6,816	—	—	153	116	826	8,831	—	6,243	49,495
Mohale's Hoek and Quthing	103	12,991	28,250	6,903	6,744	—	1,081	360	353	2,016	16,288	—	8,802	82,544
Qacha's Nek	81	8,957	8,337	2,719	14,146	—	2,371	437	—	—	12,341	9,241	11,826	52,177
Mokhotlong	19	2,526	4,534	650	4,676	706	817	20	—	471	1,336	—	1,487	15,171
Totals	505	49,629	64,313	41,759	41,508	706	5,482	1,550	469	3,448	43,818	9,241	35,371	250,645

Average No. of sheep per flock	98 sheep.
Average weight per sheep	5.05 lbs.
Average weight clean fleece wool only per sheep	3.19 lbs.
Percentage of combing	29.32%
Percentage of short wool	17.28%
Percentage of C. & C. & XM	16.56%
Percentage of outsorts	36.84%

WOOL CLASSING RETURN.
Period September, 1938, to April, 1939, for the whole territory.
Various Classes and Weight in lbs.

Veterinary Area.	No. of flocks.	No. of sheep.	Comb-ing. Shorts.	C. & C. & X.M.	L.L.	L.	BUR.	CBP.	BP.	BKS.	LOX.	Other Lines.	Total Weight of wool. lbs.
Butha Buthe	92	7,777	6,492	10,087	5,043	2,604	—	—	5,043	—	5,757	—	35,026
Teyateyaneng	23	848	1,994	1,005	261	—	—	—	209	—	355	—	3,824
Maseru	119	6,925	7,743	10,017	2,834	306	522	—	746	—	5,497	—	27,665
Mafeteng	200	18,033	19,840	29,008	8,351	1,333	1,460	744	3,606	—	14,134	—	78,476
Mohale's Hoek and Quthing	143	15,021	37,072	8,288	8,490	—	—	—	20,174	3,521	11,750	—	89,295
Qacha's Nek	155	18,564	15,534	13,938	32,022	—	130	—	14,493	—	9,620	—	85,737
Mokhotlong	40	5,696	9,681	1,591	9,835	1,254	—	—	2,627	—	2,429	—	27,417
Totals	772	72,864	98,356	73,934	66,836	5,497	1,982	874	46,898	3,521	49,542	—	347,440

Average No. of Sheep per flock 94.38 sheep.
 Average weight per sheep 4.77 lbs.
 Average weight clean fleece wool only per sheep 3.40 lbs.
 Percentage of Combing Wool 29.89%
 Percentage of Short Wool 21.85%
 Percentage of C. & C. & X.M. 19.24%
 Percentage of Outsorts 29.02%

From the foregoing tables it will be observed that the number of sheep handled during the period under review shows an increase of 96,795 units over the previous season. This indicates progress, although the percentage of coarse and coloured wool has shown a slight increase due to the fact that many unattractive fleeces were included in this line during the 1938-39 season.

The average weight of wool per sheep shows a slight decrease due to a substantial increase in the shearing of short wool.

(c) GENERAL.

Due to favourable weather conditions throughout the year and the compulsory monthly dosing, all small stock maintained good condition. With the exception of "Fluke," the incidence of which is localised, it is hoped that the veld will, in a few more years, be comparatively free from all forms of internal parasites, consequently we anticipate a still greater increase in our small stock population.

During the year 12,273,961 doses were administered under the compulsory monthly dosing scheme for internal parasites. Many farmers dose their small stock for "Fluke," using Carbon Tetrachloride supplied by the Department on repayment. During the year 20,227 units were dosed for "Fluke."

In either case pregnant sheep and very young lambs are not dosed. The former are exempted for two weeks before and two weeks after lambing, whereas lambs are not dosed until they are four weeks old. Weather conditions very often prevent dosing to schedule, and consequently one cannot assume that each unit of small stock is dosed twelve times in a calendar year.

The policy for free voluntary dipping for "ked" infested sheep and for certain small stock which are exported to the Union, has been taken advantage of by flock owners, and in the course of time keds, which are a menace to the sheep industry, should disappear. During the year 28,646 units were dipped for "ked." This is an encouraging result in view of the incidence of the pest being more or less localised in certain areas.

During the year 20,943 sheep and goat rams were emasculated as follows:—

By members of the Veterinary Staff ..	18,484
By members of the Agricultural Staff ..	2,459

These figures do not reflect those emasculated by the farmers themselves. It will be recollected that through the good offices of the Paramount Chief, who decreed that no undesirable sheep ram should be permitted to pollute his people's flocks, the territory was practically purged of this menace to the sheep and wool industry.

During the year a certain number of retrogressive owners were brought to book for neglecting to continue to carry out the Paramount Chief's orders.

The tables appended show comparative statistics for the years 1936/37, 1937/38, and 1938/39:—

1936/37.	Sheep.	Goats.
Census	1,283,394	411,931
Field inspection	9,775,763	3,030,982
Doses administered for worms	8,825,819	2,935,226
Castrated	9,673	2,975
Dipped	5,249	44
Exported	3,938	102
Imported	7,488	108
Wool exported in lbs.	5,872,791	
Mohair exported in lbs.		783,885
Skins exported in lbs.		63,097
1937/38.	Sheep.	Goats.
Census	1,470,361	489,574
Field inspection	9,093,976	3,102,658
Doses administered for worms	8,594,360	2,924,253
Castrated	17,879	3,656
Dipped	9,396	1,451
Exported	1,641	98
Imported	12,507	402
Wool exported in lbs.	5,013,460	
Mohair exported in lbs.		779,980
Skins exported in lbs.		42,625
1938/39.	Sheep.	Goats.
Census	1,598,812	568,687
Field inspection	10,707,247	3,796,833
Doses administered for worms	8,894,517	3,379,444
Castrated	16,079	4,864
Dipped	31,629	663
Exported	1,678	78
Imported	22,715	685
Wool exported in lbs.	7,256,165	
Mohair exported in lbs.		1,036,136
Skins exported in lbs.		48,378

21—EQUINES.

A census was taken during the year revealing the following equine population:—

Basuto ponies	87,960
Donkeys	27,360
Mules	1,165

The Basuto pony figures when classified are as follows:—

Stallions.	Mares.	Geldings.
15,904	47,125	24,931

As will be seen from the following table there was a steady increase of ponies and donkeys in the territory during the last five years. This is entirely due, in the case of donkeys, to favourable seasons, augmented to some extent by introductions:

Year.	Horses.	Asses.	Mules.
1935	72,701	18,911	986
1936	84,650	22,361	1,275
1937	85,017	22,766	1,068
1938	87,778	25,314	1,076
1939	87,960	27,360	1,165

As already indicated there are 43 Government owned stallions and 30 Catalonian "Jacks" standing at stud in the territory for the purpose of equine improvement. The majority of the stallions introduced are Thoroughbred, and already well over a thousand foals have been produced. There are still, however, far too many scrub stallions, but it is hoped that each succeeding year will show a diminution in their number.

The rehabilitation of the once famous Basuto pony to its former standard will be apparent in the course of time when the progeny of the Thoroughbred stallions reach the breeding age and all "scrub" stallions are eliminated and eventually replaced by better animals.

The encouragement of mule breeding is laudable as there is a great scarcity of mules in Basutoland. In a few years, however, as a result of the Government's policy, the mule population should be materially increased. As a result of the dearth mentioned, the Government is often obliged to purchase mules in the Union for pack purposes. Mules are far more economical than horses for pack work, being practically self-supporting and not requiring shoeing. They can carry heavier loads and have much greater powers of endurance and, in addition, they are serviceable up to twenty years of age.

There is an ever-increasing demand for donkeys for transport. The demand is due not so much to the scarcity of pack oxen but to a preference for donkeys for that purpose. Importations, although restricted by law, have latterly been allowed and adult geldings in large numbers have been imported in order to enable traders to transport wool and wheat from the mountain stations to lowland depots. It is well known that donkeys cannot be acquired in Basutoland from Natives, except in very small numbers and at considerably enhanced prices. The Native people realise the value of their donkeys and do not like to part with them. Up to 8/- per bag of grain is paid for transport from some of the mountain stations.

During the year 1,106 donkeys were introduced from the Union chiefly by traders. Unfortunately, Union donkeys take some time to acclimatise.

22—STOCK THEFT.

Mention was made in previous reports of the incidence of stock thieving and its detrimental effects on the livestock improvement schemes of the territory. The activities of the police during the past few years have helped to check this evil.

23—PIGS.

Among the Native population, pigs are only produced for domestic requirements. There is no Native export trade in pigs. A few European traders in the territory produce pigs on a minor scale for export. Apart from internal parasitism, disease among pigs is a negligible factor. The pig population in the territory rises and falls with the food position. During the past two or three years there has been a considerable increase in the pig population; this indicates not only good grain production but careful storage of considerable quantities to tide the Natives over until the new crop is harvested. It can be seen, therefore, that if there is a large number of pigs in evidence during the spring and early summer, it is a sure index that the grain stores are far from empty.

24—POULTRY.

Poultry husbandry is practised on a very small scale. Many European residents and a few progressive Native farmers are enthusiastic, but thieves and vermin materially handicap the progress of the industry.

The incidence of disease, notably Fowl Typhoid, is also a menace, although prophylactic inoculation against this disease has given good results where outbreaks are reported.

25—DOGS.

With the exception of those owned by European residents, the dogs of the country can only be described as a heterogenous collection. In certain areas Natives pool their dogs and hunt jackals and other vermin. In a few isolated cases greyhounds are bred for export.

26—EDUCATIONAL WORK.

It is the constant endeavour of the Government to elevate the standard of animal husbandry along livestock improvement lines. Continuous persuasive propaganda and demonstration work is performed concurrently with other duties. A scheme was evolved in 1938, whereby lectures were to be delivered annually by officers of the Agricultural Department to Native teachers employed by the Education Department. A number of such lectures were delivered during the year. The lectures covered all branches of animal husbandry. The students were keenly interested and asked many questions.

27—EXTRANEOUS DUTIES.

Happily the members of the Veterinary Staff were not called upon during the year to render emergency services of a more or less extraneous nature, such as the destruction of locusts, rodents, etc.

28—LOCUSTS.

There has been no large visitation since 1935.

29—CONTRIBUTIONS TO THE PRESS.

No articles were contributed to the Press during the period under review.

30—PUBLICATIONS.

No publications were compiled during the period under review.

31—CONFERENCES.

No Annual Conference between the Chief State Veterinarians of the High Commission Territories and the Heads of the Union State Veterinary Services took place during the year.

32—ACKNOWLEDGMENTS.

The grateful thanks of the Division are due to the Director of Veterinary Services of the Union of South Africa, who has at all times assisted with advice, material and general co-operation.

33—MICROSCOPIC WORK.

The number of smears submitted for the period under review has shown a substantial increase over the previous year.

The following table shows the positive smear figures for the year:—

Diseases.	Bovines.	Canines.	Equines.	Porcines.
Anthrax	3	—	—	—
Anaplasmosis	83	—	—	—
Quarter Evil	27	—	—	—
Piroplasmosis	1	43	25	—

34—TRAVELLING ON OFFICIAL WORK.

To the Union: The Principal Veterinary Officer paid 22 visits to the Union for the purpose of (a) purchasing stallions and Catalanian "Jack" donkeys for equine improvement purposes, (b) purchasing bulls for the Leper Settlement Farm at Bots'abelo, (c) purchasing trek oxen, donkeys and pack mules for the Department, and (d) judging at Agricultural Shows. In addition to the foregoing, 10 visits were paid to the Union in connection with clinical work in accordance with the Inter-state Veterinary Co-operative Scheme, which farmers in the border districts of the Orange Free State greatly appreciate. These services are rendered without interfering with the Principal Veterinary Officer's official duties in Basutoland.

Fees amounting to £30 7s. 0d. were collected in the latter connection and paid into revenue.

Within Basutoland: Fifty-three official journeys were undertaken by car, involving 5,576 miles. One mountain trek was undertaken extending over a period of ten days. The sub-districts of Butha Buthe and Mokhotlong were included in the itinerary.

35—LEAVE OF ABSENCE.

The Principal Veterinary Officer was engaged on official duty throughout the whole year.

36—AGRICULTURAL SHOWS.

The Principal Veterinary Officer acted as judge of the horse sections of the Leribe, Peka, Teyateyaneng, Mafeteng and Mohale's Hoek Agricultural Societies' shows. There were good entries at each show and it was a great pleasure to see the keenness displayed by the exhibitors. With one or two exceptions the exhibits were not of a good standard. Nevertheless, shows are encouraging the livestock improvement policies of the Government.

37—LIVESTOCK SALES.

The inauguration of livestock sales during the year has proved quite a success. As time goes on it is anticipated that the venture will become a great boon to the farmers. Excellent livestock sale yards have been erected at Maseru, Peka, Leribe, Mafeteng and Qacha's Nek. Reputable auctioneers are appointed by the Government, and the firms selected are of good standing with an intimate knowledge of the Basuto.

The auctioneers' commission is paid by the purchaser in the case of Native owned stock, and by the seller in the case of European owned stock. A small percentage of the commission is earmarked for the Farmers' Associations.

Ten sales were conducted during the year, and as time goes on it is anticipated that there will be a substantial increase in the number.

The following particulars of the above are of interest:—

PARTICULARS OF LIVESTOCK SALES.

Date	Venue.	ENTRIES.				SALES.				AVERAGE PRICES.					Pigs.	Total. Amount.
		Cattle.	Equines.	Sheep.	Goats.	Pigs.	Cattle.	Equines.	Sheep.	Goats.	Pigs.	Cattle.	Equines.	Sheep.		
22.2.39.	Maseru	61	7	—	—	—	41	1	—	—	£4 14 10	£5 5 0	—	—	—	£199 12 6
21.2.39.	Mafeteng	35	7	40	—	—	20	—	29	—	6 11 8½	—	0 13 6	—	—	151 5 6
14.2.39.	Leribe	200	30	30	—	—	37	—	19	—	6 13 6	—	1 7 0	—	—	273 3 0
15.2.39.	Peka	40	4	60	3	3	10	—	—	—	7 18 9	—	—	—	—	79 7 6
29.3.39.	Maseru	67	—	18	—	—	10	—	—	—	6 12 0	—	—	—	—	66 0 0
21.3.39.	Mafeteng	103	3	26	—	—	14	1	5	—	6 17 0	4 10 0	0 11 7	—	—	103 5 6
15.5.39.	Leribe	450	—	—	—	—	102	—	—	—	6 3 0	—	—	—	—	627 10 0
16.5.39.	Peka	84	—	—	—	—	6	—	—	—	4 8 9	—	—	—	—	26 12 6
22.5.39.	Mafeteng	156	—	65	—	—	15	—	—	—	4 19 10	—	—	—	—	74 17 6
23.5.39.	Maseru	38	—	—	—	—	2	—	—	—	8 10 0	—	—	—	—	8 10 0

PART II.**DISEASES OF DOMESTICATED ANIMALS IN BASUTOLAND.**
38—BACTERIAL DISEASES.

In Cattle: Anthrax; Bacilliary Necrosis; Malignant Oedema;
Quarter Evil; Scours; Paratyphoid; Vaginitis.

In Equines: Strangles.

In Sheep: Bronco-Pneumonia; Paratyphoid.

In Poultry: Fowl Typhoid.

39—PROTOZOAL DISEASES.

In Cattle: Anaplasmosis; Piroplasmosis.

In Equines: Piroplasmosis.

In Dogs: Piroplasmosis.

In Sheep and Goats: Nil.

40—VIRUS DISEASES.

In Cattle: Ephemeral Fever.

In Equines: African Horse Sickness.

In Pigs: Nil.

In Sheep: Blue Tongue.

In Dogs: Distemper.

In Poultry: Roup (Avian Diphtheria).

41—MYCOTIC DISEASES.

In Cattle: Actinomycosis; Ringworm.

In Equines: Ringworm.

In Dogs: Ringworm.

In Cats: Ringworm.

42—METAZOAL PARASITES.

In cattle, equines, pigs, sheep, goats, dogs, cats and poultry.

(1) Helminthiasis.

(2) Ectoparasites.

43—POISONINGS.

(1) Vegetable Poisonings;

(2) Mineral Poisonings.

44—MISCELLANEOUS DISEASES.

In Cattle. Ophthalmia.

In Horses: Endemic Cirrhosis; Osteoporosis.

45—ANTHRAX.

Unfortunately it is difficult to determine accurately the incidence of anthrax in the territory for the following reasons:

- (1) Only a small percentage of smears are submitted from animals which die. The period under review, however, showed a substantial increase in the number of smears submitted for examination.
- (2) All cattle in infected areas are inoculated bi-annually.
- (3) All imported cattle are inoculated on entry. To facilitate the work no cattle may enter the territory except by way of declared ports of entry.

(4) All calves born in infected areas are inoculated.

(5) All cattle entering infected areas are inoculated.

The policy of universal inoculation was abandoned and the department is now concentrating on infected areas only.

The incidence of this disease is on the wane.

The following shows the position as reflected in the smear register:—

Number of infected areas	3
Number of deaths from Anthrax	3

46—**MALIGNANT OEDEMA.**

Cases of this disease were reported following injuries, operations, etc.

47—**BACCILLIARY NECROSIS.**

A number of cases were reported and appropriately treated.

48—**QUARTER EVIL.**

This disease is very prevalent in the territory. An increased number of outbreaks occurred and these were dealt with by vaccination with Blacklegol. Unfortunately owners are reluctant to spend money on vaccine, although there is a decided trend towards patronising Blacklegol as, unlike the filtrate supplied by the Union Government, it confers a longer immunity.

49—**SCOURS.**

Cases of diarrhoea occur in calves. These are amenable to treatment; in the case of freshly weaned calves by putting the calves back to suckle. Cases are usually associated with bad hygiene and dietetic errors.

50—**PARATYPHOID.**

A number of outbreaks were successfully dealt with by preventive vaccination.

51—**VAGINITIS.**

This disease is prevalent, particularly amongst cattle owned by Europeans.

52—**STRANGLES.**

Although the disease appears to be recurrent in certain areas very few cases were encountered. All cases dealt with at the Clinic were treated with curative vaccine.

53—**BRONCHO-PNEUMONIA.**

This disease is almost entirely confined to sheep, and is met with either as a post-shearing occurrence or after vaccination for Blue Tongue, particularly following a cold snap.

54—**FOWL TYPHOID.**

A number of outbreaks were successfully checked by isolation of infected birds and preventive inoculation of all contacts.

55—**ANAPLASMOSIS.**

All Government owned cattle are artificially immunised against this disease. Unfortunately a breakdown of immunity occurred in a few cases, but the animals recovered with appropriate treatment. The Gallsickness Prophylactic Vaccine used,

is supplied by the Union Government. The disease is prevalent amongst Native owned cattle throughout the lowlands. Unfortunately the use of vaccine does not appeal to all owners, and in many cases they are not prepared to pay for the vaccine although it is only 9d. per dose.

56—PIROPLASMOSIS (Cattle).

This disease is very rarely encountered.

57—PIROPLASMOSIS (Equines).

Twenty-five cases of "Biliary Fever" in equines were treated at the clinic and elsewhere. Each patient made an uneventful recovery when treated with either "Piroblue" or "Acaprin."

58—PIROPLASMOSIS (Canines).

Forty-three cases of "Biliary Fever" were treated at the clinic, and practically all recovered after intra-muscular injection of "Acaprin."

59—EPHEMERAL FEVER.

In certain areas the so-called "Three-days' Sickness" of cattle was reported during the year. Fortunately it was not responsible for any mortality.

60—AFRICAN HORSE SICKNESS.

This disease was prevalent during the months of March and April, but was localised in certain lowland areas. Prophylactic measures have been taken in the case of Government owned animals and those owned by officials in the service of the Government.

61—CATARRHAL FEVER OF SHEEP.

The disease was prevalent in certain areas. Despite our advice flock owners are unwilling to resort to preventive inoculation although they are beginning to realise its advantages.

62—DISTEMPER.

Only a few cases were brought to the clinic and these were successfully treated with curative vaccine.

63—AVIAN DIPHTHERIA.

No outbreaks of this disease were reported.

64—ACTINOMYCOSIS (Cattle).

"Lumpy Jaw" is not prevalent in this territory.

65—RINGWORM (Cattle).

The disease is widespread.

66—HELMINTHIASIS.

Almost every conceivable variety of helminth is to be found in livestock in Basutoland. Fortunately, in the case of sheep and goats, the compulsory monthly dosing scheme is gradually eliminating those internal parasites belonging to the Trematoda, Cestoda and Nematoda groups of helminths. In addition to the foregoing, special treatment for sheep and goats infected with "Liver Fluke" is resorted to. *Stilesia Hepatica* occurs in the bile ducts of ruminants but is of no economic significance.

Many owners bring their equines to the clinic for worm treatment.

67—ECTOPARASITES (Small Stock).

The territory has enjoyed freedom from scab for the past seven years, and continues to do so.

Ked (*Melophagus ovinus*) infestation is prevalent in parts, and many owners requisition for dipping service. Dip is now supplied free of charge.

The paralysis tick (*Ixodes rubicundus*) causes mortality during the autumn in the lowlands.

Linognathus africanus—the blue louse—is found on sheep.

Bovicola capra is prevalent on goats.

Oestrus ovis—the Nasal Fly—is very prevalent and causes mortality amongst sheep, particularly in the lowlands.

Although all varieties of blow flies found in South Africa are encountered in Basutoland they do not appear to menace unduly the sheep industry. The stable fly (*Stomoxys calcitrans*) causes mortality after shearing, particularly in the lowlands during very wet seasons.

68—ECTOPARASITES (Large Stock).

Lousiness (*Pediculosis*) is almost universally encountered. Lice set up anaemia and skin irritation causing loss of condition, particularly in working animals. Owing to the lack of dipping tanks, hand-spraying has to be relied upon. This is a tedious operation.

Mange: The equine mange position shows definite signs of improvement; 77 cases were treated.

Mange (*Psoroptes Communis Bovis*) is prevalent. The parts attacked are the base of tail, neck, shoulder and rump. The disease causes much economic loss in cattle.

69—POISONINGS (Vegetable).

No cases of vegetable poisoning were reported during the year.

70—POISONINGS (Mineral).

Cases of arsenical poisoning were reported in cattle due to the malicious distribution of arsenical dip on the pasture.

71—OPHTHALMIA.

Specific or periodic ophthalmia is of rare occurrence. The Eye Worm, *Thelazia Rhodesii*, is fairly common in cattle and apparently quite harmless.

72—ENDEMIC CIRRHOSIS (Grass Staggers).

Regionally this disease is confined to the highlands and subjectively to aged horses. It is known to the Natives as "Hlohoana." On the northern and eastern slopes of the Maluti the incidence of *Senecio* is most marked because this aspect favours its growth. Comparing the mortality in Basutoland from this disease with that of parts of East Griqualand, across the border, one can be assured that "Grass Staggers" does not constitute as grave a menace to horse-breeding in Basutoland as people imagine; the reason being that in East Griqualand all farms are paddocked and consequently there is intensive grazing,

whereas in Basutoland there are no fenced areas and animals have free range.

73—OSTEOPOROSIS.

“Bone Disease” as it is called, is rather common in horses in the lowlands, and is due to feeding too heavily on maize. Its etiology has been traced to that cause.

PART III.

MEASURES TO BRING ABOUT IMPROVEMENT OF LIVESTOCK.

74—CATTLE.

(1) HEALTH IMPROVEMENT MEASURES.

(a) By preventive inoculation.

(i) Anthrax.

Elsewhere in this report mention is made of the measures taken to prevent Anthrax.

(ii) Anaplasmosis.

All Government owned cattle in the territory were immunised against Anaplasmosis in 1936. All replacements and fresh purchases are similarly treated. In certain areas the Natives have had their cattle inoculated. Total number treated, 4,978.

(iii) Quarter Evil.

Only a few owners avail themselves of the services of the Division to inoculate their cattle. Total number treated, 3,770.

(b) By Legislation.

With the exception of Anthrax, no compulsory measures are in force in Basutoland to deal with cattle disease by preventive inoculation.

(c) By Better Husbandry.

The more progressive cattle owners have heeded the Department's advice in this connection.

(2) QUALITY IMPROVEMENT MEASURES.

(a) By Voluntary Emasculation.

As will be seen elsewhere in this report, many undesirable bulls were emasculated by members of the Agricultural and Veterinary Staffs, with the consent of the owners.

(b) By the Introduction of suitable sires.

The introduction by the Government of sires of approved breeds under the new Cattle Improvement Scheme will assuredly give a fillip to the cattle industry.

(c) By Legislation.

The Basutoland Cattle Improvement Proclamation, No. 54 of 1936, prohibits the introduction of “scrub” bulls. All cattle presented for introduction are subjected to rigid inspection and culling at the prescribed ports of entry.

75—SMALL STOCK.**(1) HEALTH IMPROVEMENT MEASURES.****(a) By preventive inoculation.**

With the exception of Quarter Evil, the only preventable disease met with in Basutoland is "Blue Tongue" (Catarrhal Fever). Unfortunately, the people do not realise the value of preventive vaccination, and consequently very little is done in this connection. It is hoped that, as a result of more intensive propaganda, the mortality from this disease will diminish.

(b) By Legislation.**(i) Internal Parasites.**

The law compelling owners to dose their small stock at monthly intervals, with a remedy approved by the Principal Veterinary Officer, has been eminently successful and already a marked improvement in the health of the small stock is apparent and the numbers have materially increased as a result.

(ii) Acariasis.

Legislation exists to deal with "scab" in sheep and goats, but the territory has been free from this disease for the past seven years.

(c) By Voluntary Request.

Many owners have their sheep dipped for ked; all such dippings are carried out under official supervision. The number of sheep and goats dipped for ked and export was 32,292.

(2) QUALITY IMPROVEMENT MEASURES.**(a) By Elimination of Undesirable Rams.**

It will be remembered that through the instrumentality of the Paramount Chief, who decreed that all undesirable sheep rams in the territory had to be emasculated, a state of almost complete freedom from this menace reigned for about two years. Unfortunately, during the period under review, it was necessary to deal with a small number of owners who allowed bastard rams to reach maturity.

(b) By the introduction of suitable merino rams.

In order to replace the unsuitable rams mentioned under (a) the Government has continued the policy of introducing suitable flock rams, and up to the 30th September, 1939, 2,251 such rams had been imported from the Union.

The 1938/39 importations were distributed direct from the breeders to the various districts, and the animals sold readily as they were in full fleece and remunerative prices could subsequently be obtained by the purchasers for the wool.

(c) By Legislation.

Amending legislation was introduced in 1928, prohibiting the introduction of Persian and Bastard sheep and certain types of goats. Last year the law was amended to permit the introduction of Swiss goats in addition to Angora goats.

(d) By Better Husbandry.

The Division's activities in this direction are unceasing, and success has attended its efforts. The dissemination of knowledge through the medium of pamphlets written by members of the staff, has been very much appreciated. The demand for these publications exceeded all expectations.

76—WOOL.

Mention was made in previous reports of the measures taken to ensure the proper preparation of wool for the market and of the marked improvement in the quality of the product as a result of the improved quality of the sheep due to the introduction of superior rams, the elimination of inferior animals and the compulsory monthly dosing for internal parasitism. The erection of two additional stationary shearing sheds and the increased number of portable units are indications of progress.

During the shearing season, viz., September, 1938—April, 1939, 347,440 lb. of wool was classed under official supervision. Unfortunately, owing to the continued unsettled state of the international position, the wool market was unsteady, with downward fluctuations in prices which made the position difficult for buyers and disappointing for producers. In addition to the increased number of portable and stationary sheds it was found necessary to augment the staff of Native Learner-Classers, in anticipation of an increased poundage of wool to be classed under official supervision next season. Generally speaking, reports from coastal houses on the quality of the wool were satisfactory.

77—EQUINES.**(1) HEALTH IMPROVEMENT MEASURES.****(a) By Legislation.**

Outbreaks of equine mange are notifiable and are dealt with promptly.

(b) By Inoculation.

With the exception of the three following diseases—African Horse Sickness, the visitations of which are periodical in the lowlands; Strangles; and very occasional cases of Anthrax—horses are not exposed to any disease which can be prevented by inoculation.

(c) By Voluntary Request.

Many owners dose their horses periodically for internal parasites. For the payment of a fee of 1/- Native-owned animals are treated at the Clinic.

(2) QUALITY IMPROVEMENT MEASURES.**(a) By Voluntary Emasculation.**

Most owners are only too willing to have their undesirable sires emasculated, and during the year 859 equines were castrated by members of the Agricultural and Veterinary Divisions as follows:—

Agricultural Staff.			Veterinary Staff.		
Horses.	Mules.	Donkeys.	Horses.	Mules.	Donkeys.
137	—	75	396	3	248

Total: 859.

This figure does not reflect many hundreds castrated by the owners themselves.

(b) By the Government Stud.

The Government Stud at Maseru is well patronised.

(c) By Legislation.

Legislation to restrict the importation of donkeys is in force.

(d) By State Subsidisation.

Mention is made elsewhere in this report of an equine improvement scheme which the Government has launched.

(e) By Better Husbandry.

The more progressive horse breeders benefit by advice given them by officers of the Division.

78—NEW LEGISLATION.

The following legislative measures were introduced during the last two years:—

Proclamation No. 74 of 1937.—To permit the introduction of Swiss Goats.

Proclamation No. 36 of 1938.—Further amending the Basutoland Anthrax Proclamation (No. 7 of 1921).

High Commissioner's Notice No. 128 of 1938.—Prescribing the ports of entry at which cattle shall enter Basutoland.

High Commissioner's Notice No. 121 of 1938.—Designed to prevent the introduction of Foot-and-Mouth Disease.

High Commissioner's Notice No. 83 of 1939.—Authorising the importation of cattle into Basutoland from the district of Mount Fletcher.

PART IV.**FINANCIAL STATEMENT.**

Estimated expenditure, Financial Year 1938/39:

(a) Personal Emoluments	£8,161
(b) Other charges	13,000
Total	£21,161

Actual expenditure, Financial Year 1938/39:

(a) Personal Emoluments	£7,495 0 5
(b) Other charges	9,357 11 9
Total	£16,852 12 2

G. T. HENDERSON,
Principal Veterinary Officer.

AGRICULTURAL DIVISION.

STAFF.

EUROPEAN:

Original Staff:

- L. F. Wachter, M.B.E., Agricultural Officer, Maseru.
- H. C. Mundell, Agricultural and Livestock Officer, Maseru.
- L. H. Collett, Agricultural and Livestock Officer, Maseru.
- C. L. F. Peachey, Agricultural and Livestock Officer, Mafeteng.
- A. E. Hensley, Agricultural and Livestock Officer, Leribe.
- F. O. A. Wande, Agricultural and Livestock Officer, Peka.
- R. K. Tennant, Agricultural and Livestock Officer, Mohale's Hoek.
- B. P. Harding, Agricultural and Livestock Officer, Quthing.

NEW APPOINTMENTS:

- I. L. Chard, Agricultural and Livestock Officer, temporarily employed Maseru District.
- R. R. Horne, Agricultural and Livestock Officer, Butha Buthe.

STAFF CHANGES:

- C. H. Aitchison, Agricultural and Livestock Officer, Butha Buthe, resigned, 1939.

NATIVE:

- The Paramount Chief's Burrweed Inspector.
- 26 Agricultural Demonstrators.

NEW APPOINTMENTS:

Eight new Agricultural Demonstrators were appointed during May, 1939. These new appointments were made chiefly to assist in the furthering of the Government's vegetable gardening campaign.

Demonstration work is being carried out in an efficient manner all over the country, especially with regard to vegetable growing. All demonstrators are giving this branch of their work particular attention, with excellent results.

ANNUAL CONFERENCE OF THE AGRICULTURAL DEPARTMENT.

A conference of all the European members of the Agricultural Department was held in Maseru on the 26th September.

The meeting was opened by Mr. D. W. How, the Government Secretary, representing His Honour the Resident Commissioner.

These annual conferences serve a most useful purpose in bringing the staff together and so enabling them to talk over difficulties encountered in the work. These discussions frequently bring to light means of overcoming these difficulties.

The policy of the Government and all questions relating thereto are explained by the Director, and the discussions which follow enable officers to acquire a complete grasp of all major and minor points, which, when put into practice, cover the policy expounded.

PART II.

GENERAL AGRICULTURE.

AGRICULTURAL AND WEATHER CONDITIONS.

The weather conditions for the period covered by this report were, on the whole, favourable for crop production. A wet season, with the exception of a dry spell in March and April, was experienced.

The lowland wheat crop was promising, but unfortunately much of it—between 20% and 30%—was damaged in the stacks due to excessive rainfall during January and February when 15.12 inches of rain was recorded. Weather conditions were very favourable for mountain wheats and a good crop was reaped in most districts.

Spring planting of the maize and sorghum crops in the lowlands and semi-mountain districts was carried out under good conditions, and excellent germination took place. Unfortunately in the northern districts, especially Leribe, a dryer spring was experienced than in other parts, viz., the rainfall for November was only 1.52 inches at Leribe and 4.05 inches at Mafeteng. The crops, in most instances, were planted on the late side and many lands were left unsown.

Owing to severe frosts occurring on the 17th and 18th November, a large percentage of the maize and sorghum was killed in the foothill and mountain country, and many fields of the same cereals were seriously damaged in low-lying situations in the lowlands.

December, January and February were very wet months in all parts of the country, and unless people had cleaned their lands early it was impossible to do so later; weeds, therefore, obtained the upper hand and in many instances the resulting crops were disappointing. Frost on the 25th and 26th March did a fair amount of damage to gardens and to the later planted wheat in the mountains, and was also responsible for considerable damage to maize in the lowlands. This damage, however, was not fully realised until the harvest.

Frost occurred on the 8th April and onwards from the 26th April, and was responsible for stopping all crop growth.

On the whole, the winter was not a severe one except for several very cold spells. Up to 10° of frost was registered in June and 8° in July. From the 6th to 11th August up to 19° of frost was recorded and in September 10°.

The cold spells experienced during the winter were responsible for livestock rapidly losing condition towards the end of this season, at which time all stock were in poorer condition than they had been for some years.

MONTHLY RAINFALL FOR THE DISTRICTS AND SUB-DISTRICTS: 1938/1939.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	TOTAL.
Maseru	3.66	2.74	3.20	6.39	6.20	1.57	0.35	1.18	0.03	0.94	2.38	0.43	29.07
Mafeteng	2.57	3.58	3.49	7.64	7.48	1.34	1.36	1.85	0.20	0.63	2.20	0.29	32.63
Mohale's Hoek . . .	3.24	3.33	3.90	7.49	5.28	0.97	1.33	1.78	0.25	1.37	2.58	0.63	32.15
Quthing	3.99	4.17	6.92	5.07	5.76	0.33	1.07	1.71	0.06	1.22	1.35	1.90	33.55
Qacha's Nek	2.81	3.83	8.48	7.85	8.16	3.65	0.14	1.93	0.08	1.08	1.04	2.29	41.34
Mokhotlong	2.56	1.46	4.58	4.82	4.41	1.50	0.58	1.43	0.02	0.68	0.65	0.75	23.44
Teyateyaneng . . .	2.84	2.70	4.01	6.14	4.61	1.58	0.48	1.27	0.13	0.92	1.77	0.77	27.22
Butha Buthe	3.58	1.63	3.60	4.28	7.99	1.94	0.00	1.92	0.22	0.68	1.37	1.44	28.65
Leribe	2.63	1.52	4.88	8.36	8.61	2.32	0.97	1.49	0.04	0.91	1.98	0.96	34.60
Botsabelo	3.74	2.49	6.55	6.43	5.09	2.30	0.44	1.33	0.05	1.17	2.31	0.62	32.52
Mokhalinyane . . .	2.68	2.04	4.87	5.83	7.05	2.47	0.56	1.69	0.02	0.45	2.01	0.00	29.67
Sehlabathebe	3.09	4.83	7.41	7.21	3.72	5.45	0.17	1.12	0.00	0.00	0.20	0.00	33.20
Roma	4.64	2.76	4.69	6.19	5.98	1.79	0.44	1.82	0.09	0.01	2.42	1.83	33.71

REPORT ON THE CONDITION OF THE CHIEF AGRICULTURAL CROPS, 1938/39.

WHEAT:

The lowland wheat crop was fair. The late frost experienced in November was responsible for considerable damage to wheat in low-lying situations; this was apparent from the high percentage of thin grain in many of the samples. Much of the wheat harvested was spoilt in the stacks owing to excessive rainfall in January and February. It was estimated that 20% to 30% of the wheat was so affected.

The mountain and semi-mountain wheat crops were good, but did not come up to expectation owing to the following causes:

- (1) Hail did considerable damage in some districts.
- (2) Waterlogging and rust was noticeable on lands which did not drain naturally.
- (3) In some districts frosts during March seriously damaged the later sown wheat. This was especially noticeable in the Mokhotlong District.

It is difficult to give a true estimate of the mountain wheat crop which will come into commerce, as owing to the failure of maize a much larger amount of wheat will be consumed locally, and also, owing to the poor condition of the transport animals, the exportable crop arrives very slowly from the mountains.

PEAS:

The pea crop was very good in the mountain districts, and a larger crop was grown in the lowlands than has been the case for some years. The combined crop is estimated to be larger than that produced last year.

Owing to the shortage of the maize crop it is certain that more peas than usual will be used for human consumption.

BARLEY:

Good crops were harvested. These came up to last year's standard.

BEANS:

Beans are chiefly grown in the lowlands, but only a fair crop was obtained this season. This was due to the exceptionally wet weather experienced during the months of January and February, in consequence of which the less hardy varieties suffered badly from rust.

Hardy varieties such as Cowpeas and the Seven Year Bean produced the outstanding crops.

MAIZE AND SORGHUM:

The crops of maize and sorghum in the foothills and semi-mountain districts of the territory were practically a failure. Lands which escaped the severe frosts during November were seriously damaged by early frosts which occurred during March.

Maize in the Lowlands.

This crop showed great promise during the early stages of its growth, except in the northern part of the territory, where less rainfall was experienced than in the south, but later, due to excessive rainfall, was smothered by weeds as cultivation of

the lands was most difficult. In some instances lands were waterlogged.

Due to the causes stated, the maize crop, on the whole, was below normal and much of the grain was light and chaffy.

Frost which occurred on the 26th March was responsible for much damage.

Fields of maize, however, which were not affected by frost and planted in rows and kept well cultivated produced excellent results.

Sorghum in the Lowlands.

About the same acreage as last year was planted. The crop did well and the majority of it matured before the advent of the frost.

The total sorghum crop harvested for the whole territory was, however, below that of last year, due to so many failures in the foothill country resulting from frosts in November.

INCIDENCE OF INSECT PESTS:

Generally speaking, the period under review was freer from insect pests than the previous season.

No swarms of the Brown or Red-winged Locusts were reported anywhere in the territory.

THE ELEGANT GRASSHOPPER:

The Elegant Grasshopper, in spite of being reported in last year's Annual Report as having practically died out, re-appeared in large numbers in many parts of the territory during the summer and was responsible for considerable damage to gardens and fruit trees.

CUT-WORM:

Very little damage by cut-worm was done this season to crops in the lowlands. In the mountain districts, however, as usual, the crops suffered considerably.

MAIZE STALK BORER:

The damage done to maize and sorghum plants by this pest was much less than usual. The only serious damage done was to some of the later planted maize, especially to bread mealies.

THE C.M.R. BEETLE:

This insect, by devouring the blossom, is always responsible for a certain amount of damage to the bean crop. The damage is especially noticeable during the times of hot weather and drought.

VARIOUS SPECIES OF APHIS:

Practically no damage was done by Aphis to vegetables or fruit trees during the season under review.

ESTIMATES OF AGRICULTURAL PRODUCTION FOR 1939 AND THE PRECEDING YEARS.

Crop.	1935	1936	1937	1938	1939
Maize	513,663	491,114	1,135,983	873,750	758,835
Sorghum	194,498	184,179	297,117	197,812	164,129
Wheat	259,331	245,572	383,645	257,812	364,802
Peas, Beans & other crops }	64,833	61,393	148,558	109,218	156,562

These crop returns are given in bags of 200 lb.

The explanation as to why much larger crops have been recorded since 1936 appears in the Annual Reports for 1937 and 1938.

AGRICULTURAL ASSOCIATIONS:

(Farmers' Associations, Co-operative Societies and Native Women's Vegetable Gardening Associations.)

During the previous season there were 101 Associations, viz.: 23 men's, 37 women's and 41 combined associations. On the 30th September, 1939, there were 125 Associations; this is an increase of 24. The Men's Associations show an increase of 5, the Women's an increase of 30 and the Combined Associations a decrease of 11. The total membership of all Associations shows an increase of 922 members. The following table shows the position as it is to-day:—

NUMBER OF AGRICULTURAL ASSOCIATIONS IN THE TERRITORY.

District.	Associations.		Com- bined. Assocs.	Total No. of Assocs.	Total No. of Members.
	Men's	Women's			
Maseru	6	24	10	40	952
Mafeteng	3	6	11	20	1,119
Mohale's Hoek	3	9	5	17	292
Quthing	3	8	—	11	144
Qacha's Nek	4	5	—	9	257
Mokhotlong	1	1	—	2	40
Teyateyaneng	1	—	1	2	32
Leribe (including sub - districts of Peka and Butha Buthe)	7	14	3	24	743
Totals	28	67	30	125	3,579

NATIVE (MEN'S) FARMERS' ASSOCIATIONS:

Although the formation of Men's Farmers' Associations is often disappointing, it being most difficult to find men of sufficient education and keenness who will undertake, gratis, work on the committee or the important post of secretary, there are a number of Associations which are doing really useful work.

The Agricultural Officers are doing their best to start Central District Associations, to which all the small Associations are to be affiliated. This scheme has already been carried out in the Mafeteng district and gives promise of being very successful.

The Farmers' Associations are functioning in the following manner:—

1. Adopting better agricultural methods and assisting the Agricultural Officers to persuade other people to do the same.
2. Doing everything in their power to advance the Government's war measure, namely, to increase production of foodstuffs in the territory.

3. Undertaking the management and the running of the Agricultural Shows, with the help and advice of the district Agricultural Officers.
4. Helping in the running and advertising of the Stock Sales and Vegetable Sales.
5. Co-operating in the purchasing of vegetable seeds, fencing for gardens, fertilizer and agricultural implements.
6. Tendering, co-operatively, for Government supplies, such as mealies, teff, etc.

NATIVE WOMEN'S AND COMBINED ASSOCIATIONS:

The formation of these Associations meets with continued success. Their efforts are chiefly directed towards vegetable gardening. The women are very keen and hard working, and greatly assist the district Agricultural Officers by promoting general interest in the laying out of good terraced gardens in the villages, and in the growing of a plentiful supply of green vegetables.

MARKETS FOR STOCK AND NATIVE PRODUCE:

During the season when vegetables and fruit were abundant, Vegetable and Produce Sales were held regularly at Maseru, Teyateyaneng, Leribe, Butha Buthe, Mafeteng, Mohale's Hoek and Quthing.

A good supply of vegetables was grown throughout the season, and garden produce met with a ready sale at remunerative prices.

The Agricultural Associations assist in the running of markets, and a small toll is collected from each person offering produce for sale.

STOCK SALES:

Stock sales have been held at each centre where sale pens have been erected, viz.: Maseru, Mafeteng, Peka and Leribe.

When these stock sales are better understood by the Natives they will serve a most useful purpose as they fix a market price for all types of stock. Full particulars of the sales which have been held up to the 30th September, 1939, are furnished by the Principal Veterinary Officer in his report.

AGRICULTURAL SHOWS:

Agricultural Shows were held at Leribe, Peka, Teyateyaneng, Morija, Mafeteng, Mohalinyane (Mohale's Hoek District), Qacha's Nek and Seforong.

These shows were organised by the Farmers' Associations in the respective districts, which were helped and advised by the local Agricultural Officer and his Agricultural Demonstrators.

The Government made grants up to £10 to each show on the pound for pound principle. These grants are used as prize money for the classes which encourage the agricultural projects of the Department.

As a whole the entries in the Stock Classes have been few and disappointing. A number of good examples, however, of both cattle and sheep, which were the progeny of Government bulls or imported rams, were seen at several of the shows, and it was apparent that considerable improvement was taking place.

The Produce Sections, including vegetables, were very good. Great keenness is displayed by the exhibitors in these sections.

ECOLOGICAL SURVEY OF BASUTOLAND:

Mr. R. R. Staples, Ecologist to the Tanganyika Territory, made his second visit to Basutoland during the period covered by this report. After careful consideration and in the light of further experience gained since his previous visit he replanned the scheme of experiments for the mountain areas. The fencing of these plots has been temporarily held up owing to the death of the late Paramount Chief. It is hoped, however, that in the near future this work will be undertaken.

Mr. Staples arranged the herbarium connected with the Ecological Survey and also the Dieterlen collection of Basutoland plants. The Botanical analytical work of the Maseru Grazing and Experimental Plots was carried out by means of the point quadrat method, and a detailed report on the herbage was submitted.

These plots were stocked on the 3rd January at the rate of one beast to three acres, and grazed according to the plan laid down. In no instance was the grass quite so closely grazed as that of the surrounding pasture. The cattle did well until the end of August, when it was found necessary to supplement their grazing with 5 lb. of hay per diem for three weeks. They rapidly regained their condition during October.

The general rotational grazing policy agreed on for Government Reserves is being carried out; and this, together with the anti-soil-erosion works which have been undertaken on most of the Reserves, is responsible for a wonderful change for the better in the grass cover.

The pasture enclosures at Thaba Putsoa and Thaba Tsoeu were inspected during January, 1938, by Mr. Staples and the Agricultural Officer, and the counts of *Chrysocoma tenuifolia* (Bitter Karroo) in each quadrat were taken. These counts appear in the Annual Report for 1938. No further counts have been taken since that date, although both plots were inspected during October, 1939. The following statements indicate the present position:—

Plot 1.—Thaba Putsoa Enclosure. The whole of this enclosure had accidentally been heavily burned off during September, and it appeared that practically all the bushes were dead. Previous to burning there was a heavy crop of grass.

Plot 2.—Thaba Tsoeu Enclosure. The count of bushes taken in 1938 was very small. When this enclosure was inspected in October, there was a tremendous crop of the previous season's dry grass. Very few bushes were seen alive except for those on stony outcrops where they could not be killed by burning or smothered by grass.

From the above statements it may be taken that *Chrysocoma tenuifolia* has been eradicated in both these enclosures. The results obtained in the eradication of Bitter Karroo are reflected in the general grazing of the surrounding districts, which, in the past, were some of the worst in Basutoland. To-day, through lighter stocking, which has rested the pasture hitherto badly infested by *Chrysocoma tenuifolia* and by judicious early spring burning from two to three times, it is apparent that this pest can be controlled. Most of the grazing has made a wonderful recovery.

RODENT DESTRUCTION:

The Agricultural Department continues to co-operate with the Medical Department in the destruction of rodents. There is evidence that rodents are again increasing in several districts in the territory. This menace is being dealt with by the Medical Department's Rodent Inspector, who is maintaining a supply of poisoned wheat for issue in the affected districts.

Gerbilles were seen to be on the increase in the mountain areas of Semonkong and Lesobeng and were damaging the wheat fields. These outbreaks are being dealt with.

LECTURES AND VARIOUS DEMONSTRATIONS:

The Agricultural and Livestock Officers, the Assistant Agricultural and Livestock Officers and the Agricultural Demonstrators continue to avail themselves of every opportunity to lecture on and to demonstrate the various Government schemes for the general improvement of Native Agriculture.

Special endeavour has been made to induce as many people as possible to start vegetable gardens in their villages. The benefits to be derived from the growth of vegetables and their addition to the daily diet are constantly pointed out to the Natives, and considerable success has been attained.

Lectures are given at appropriate times on many subjects, such as the selection of seed; the proper methods of planting and cultivating the various crops, etc.

A large number of demonstrations have been given all over the territory by Officers and Demonstrators on the following subjects:—

(1) The right method of terracing and laying out of vegetable gardens; the making of compost pits and the preparation of good compost; the furnishing of water supplies for gardens, either by the making of small catchment dams or leading water by furrow from permanent supplies.

(2) The proper method of ploughing between the contour banks erected in connection with the soil reclamation campaign.

(3) The proper method of planting fruit and forest trees and the pruning of fruit trees. All Natives who receive fruit trees from the Government are instructed in pruning.

(4) The Government schemes for the improvement of all classes of stock.

Demonstrations have also been given on many other subjects. The Basuto are becoming much more appreciative of these lectures and demonstrations.

The Demonstrators stationed near the Chief Mission Stations continue to supervise the school vegetable gardens and to lecture from time to time to the students on vegetable growing. It has now been laid down, however, that a demonstrator must not devote more than one day a week to these duties.

The Agricultural Officer visited Mokhotlong during September and, together with the Assistant District Commissioner and Assistant Agricultural and Livestock Officer, toured the district, selecting good seed and lecturing on the need for improving the quality and type of wheat grown in the district. The proper methods to adopt in all operations connected with wheat growing, and the adoption of better methods of agriculture were also stressed.

The tour had been well planned and meetings were held at the following places:

Chief Seeiso's village 300 persons attended.
 Chief Rafoletsane's village 200 persons attended.
 Chief Mosuo'e's village,
 Leliingonas area 800 persons attended.

The people were keen and attentive.

The following is a list of the total number of lectures given by the Agricultural Officers and Demonstrators. The list also gives the number of Native Farmers who attended.

	No. of Lectures.	No. Present.
Agricultural Officers.	233	20,424
Demonstrators.	620	20,687

CO-OPERATION WITH THE EDUCATION DEPARTMENT:

Wherever possible, the Agricultural Department works in co-operation with the Education Department. Agricultural Officers and Demonstrators help and advise on the laying out of school gardens, etc.

A vacation course for teachers was held at the Basutoland High School from the 26th June to the 7th July. The agricultural side of the course was arranged by the Agricultural Department, and members of the Staff prepared and delivered lectures dealing with the subjects coming under their supervision.

The Officials of the Education Department and the Native School Masters who attended the course greatly appreciated the help given. Twenty lectures and practical demonstrations were given on the following subjects:—

1. Anti-soil erosion measures and the inter-dependence of the various measures.
2. Measures required to prevent soil exhaustion.
3. Afforestation and the value of trees in relation to livestock and agriculture, etc.
4. Vegetable gardens and fruit growing. The economic value and the effect of these on the health of the people, etc.
5. Crop production and seed selection. The effect of varied crop farming on soil fertility, on the health of the people and the economic returns.
6. Livestock improvement—sheep, cattle and horses, with practical demonstrations.

REPORT ON WINTER AND SUMMER CEREAL EXPERIMENTAL WORK, GRASS PLOTS AND SEED MULTIPLICATION LANDS.

WINTER CEREAL WORK:

Weather conditions throughout the season, from the point of view of rainfall, were generally very favourable for the planting of wheat, and extremely good results would have been obtained but for several heavy hail storms early in November and a severe and untimely frost in the middle of the same month.

Of the varieties of imported Canadian wheats, "Reliance," "Red Bobs" and "Ceres" appear generally to be the best types, particularly from a point of view of yield and quality. While for quality only, "Reward" and "Garnet" present the best appearance.

SUMMER CEREAL WORK:

The season was very favourable for the growth of maize and sorghum, as good rains were recorded throughout the growing season. Results from the earlier plantings, however, were adversely affected by hail storms and the late frost experienced during the first half of November.

Six new varieties of sorghum from the Bechuanaland Protectorate were tested. These were a complete failure as they proved very late maturing, and are, therefore, not suitable for growth in this territory.

GRASS PLOTS:

No new varieties of grasses were introduced for testing during the season under review. *Paspalum notatum*, *Digitaria scalarum* and *Setaria phacelata* continued to show promise. It is considered, however, that from an anti-erosion point of view they are not likely to displace *Kikuyu* or *Cynodon dactylon*.

The eight varieties of *Melilotus* (sweet clover) introduced from Canada for trial, were planted in beds on the new seed multiplication land at the river and are making excellent and rapid growth.

REPORT ON THE GOVERNMENT SCHEME FOR THE SUPPLY OF SUPERPHOSPHATE TO THE NATIVES AT COST PRICE.

Although not as many Natives as one would expect avail themselves of the Government's scheme for the buying of their requirements of fertilizer, many are realising the beneficial results to be obtained from its use, and the amount of fertilizer used in the territory this season is more than double that of last. Extensive propaganda is continually carried out by the Agricultural Officers and Demonstrators to persuade the Native farmers to buy more fertilizer.

Last season the African Explosives and Industries, Limited, donated eight Silver Cups to be competed for throughout the territory for the best manured plot in each district which had received a dressing of artificial fertilizer. Unfortunately, owing to lack of sufficient entries, it was only possible to hold competitions at three centres during the report year, namely, Leribe, Peka and Teyateyaneng. The other five cups will be competed for during April, 1940.

The prize-winning fields at the three centres where the competitions took place were outstanding and were excellently managed.

A total of 1,028 bags of Superphosphate was bought by the Basuto during the year 1938-39, as against 416 in 1937-38.

It is highly satisfactory to note that the quantity of superphosphate purchased during the period under review has increased by 612 bags on that of the previous year.

PRODUCTION OF STRONG WHEAT IN BASUTOLAND:

Most of the remarks made under this heading in the Annual Report for 1938 continue to apply.

The bulletin which was written and published on the production of Strong Wheat in this territory, giving the history of introductions and particulars of milling and baking tests carried out by the Imperial Institute Milling Companies and the

Elsenburg-Stellenbosch University on a number of local and introduced varieties of wheat, and also the history up to date of all that the Administration has done to improve the quality of Basutoland Wheat, has stimulated the interest in Basutoland wheat and has been well received.

The quality of much of the Manitoba wheat grown during the period under review was undoubtedly high, many first-class samples being seen. Manitoba wheat grown in the Mafeteng district fetched up to 21/6 per bag.

The best of the wheat varieties from Canada, including "Red Bobs," "Reliance," "Garnet," "Ceres" and a South African variety known as "Birdproof," were grown on an extensive scale in the Seed Multiplication Plots at Maseru, in order to use the seed produced for testing, on a large scale, the suitability of these varieties in the higher altitudes of Basutoland. Unfortunately, owing to a very severe frost on the 25th November, relatively little seed was secured, thus retarding for another year the work of introducing, on a wholesale scale, these wheats into the high lying mountain area. There was a fair crop of Manitoba wheat (Marquis) grown in a number of districts in the territory. It is satisfactory to note that there are to-day very many growers of Manitoba wheat besides those who have received Government issues of seed. This wheat continues to be favourably reported on. The Natives say it is a very fair cropper, matures earlier than most varieties and that it continues to resist rust better than most other varieties. In the Qhoalinyane district alone, there are fifty growers of Manitoba wheat; whilst in the Mokhotlong district there are 110 known growers.

A crop of 1,572½ bags of Manitoba wheat was grown in 1938-39 by Natives who had received Government issues of seed. Full particulars of the growth and issues of Manitoba wheat appear in annexures A and B of this report.

Samples of the Canadian wheats, together with "Birdproof" wheat, were sent to the S.A. Milling Company for analysis. The results were outstanding, proving once again that strong wheat of excellent quality can be grown in Basutoland. The protein content of the Canadian varieties of wheat grown in Basutoland were, with the exception of two, considerably higher than the results secured when these wheats were grown in Canada.

Variety.	Moisture.	Nitrogen.	Protein content.	Protein content when received from Canada		Bushel weight.	Gluten quality.
Garnet	10.8	3.18	18.13	14.4	61 $\frac{3}{4}$ lbs.	Exceptionally tough.	
Marquis	11.6	2.89	16.48	14.5	61 "	Very good.	
Reward	10.8	3.22	18.35	16.4	62 "	Very good.	
Huron	11.2	2.70	15.39	not available.	61 $\frac{1}{4}$ "	Very strong, excellent.	
Ceres	11.6	2.58	14.71	15.3	62 "	Very good.	
Red Bobs	11.2	2.56	14.60	14.2	61 $\frac{1}{2}$ "	Very good.	
Early Red Fyfe	11.8	2.64	15.04	14.1	62 $\frac{3}{4}$ "	Very good.	
Birdproof	11.6	2.44	13.90	A Basutoland variety.	60 $\frac{3}{4}$ "	Tough—good.	
Ruby	11.8	3.02	17.20	15.4	62 $\frac{3}{4}$ "	Very good.	
Reliance	12.2	2.71	15.45	14.9	62 "	Very good.	

REPORT OF THE GENERAL AGRICULTURAL DEMONSTRATION WORK CARRIED OUT IN THE TERRITORY DURING 1938/39.

The demonstration work carried out during the period under review was outstanding, especially in connection with maize and sorghum. The improvement was most noticeable where ploughing and sowing had been properly carried out under demonstration methods, and where the crops had been properly cultivated and the land kept aerated and clean of weeds. The season was very wet during January and February, and where hand-hoeing had to be relied upon many farmers were unable to clean their lands, with disastrous results to the crops.

Very little damage was done by pests, with the exception of a minor attack of mealie stalk borer which damaged the later sown bread mealies.

There were many more wheat demonstrations carried out in the lowlands than usual, and very fair crops were obtained.

The work of the Agricultural Demonstrators is increasing annually, and much useful work is undertaken by these men. They are now devoting far more of their time to the Vegetable Growing Campaign, and this may be regarded as a very successful part of their duties as is proved by the numerous useful gardens seen all over the country. Particulars of this campaign appear later in this report.

The demonstrators co-operate in every possible way with the Veterinary Department, particularly in connection with the elimination of undesirable sires of all types of stock. Particulars of this work appear in the Veterinary Section of this report.

The particulars of all demonstration work carried out appear in tabulated form in the annexures.

The following seeds were issued for demonstration purposes during the Spring of 1938.

Seventeen bags of Peanuts distributed to the lowland demonstrators, 36 bags of Anveldt Maize, 11 bags of David Makanya Sorghum, 7 bags of Swaziland Cross-bred Sorghum and 4 bags of Swaziland (Strain 2).

Seed is issued to approved Native farmers on the understanding that a similar amount of selected seed will be returned to the District Agricultural Officer after the harvest, for re-issue during the following season. A fair return from the seed issued was obtained.

The Administration is most anxious to improve the diet of the Natives, and, in order to foster this scheme, has inaugurated competitions and is giving prizes to encourage the following:—

(1) The improvement and the increased production of field crops, such as maize, sorghum, wheat, standard legumes and heavy oil bearing legumes, e.g., peanuts. The Administration holds competitions for the best lands of the above cereals. The growth of beans and peas is encouraged in every possible way. During the last few years the growth of peas has increased rapidly in the mountain districts. Fresh introductions of peanuts are made annually. These nuts are relished by the Basuto and are grown chiefly as a garden crop. Unfortunately the period of the growth of peanuts is long, and unless they can be planted

early they do not mature before the advent of the frost. It was very satisfactory to see a number of good exhibits in the classes for peanuts at the various shows.

(2) The better all-round methods of cultivation of the chief crops grown in the territory. Competitions for the best cultivated lands are held annually.

(3) The growth of a greater range of crops, especially legumes. Pea and bean seeds have been issued and advice is continually being given, especially by the mountain demonstrators, to increase the growth of peas and to use these in rotation with wheat.

(4) Native agriculturalists to grow pure strains of the various crops and to select good seed and become seedsmen themselves. The Government has bought practically all its requirements for the coming season of sorghum, maize and wheat seed, direct from Native growers. The demonstrators also advise people, who wish to buy seed, where their requirements can be met.

The competitions were divided under three headings, these being made up as follows:—

Class A.—The free distribution of seed under certain conditions, viz.: Seeds are issued free when the Government wishes to introduce a new crop, such as peanuts, or to encourage a new venture, such as vegetable gardening. For the last three years a free issue of these seeds has been made and this has been much appreciated by the Basuto.

Class B.—Small cash prizes were awarded for Field Competitions. These covered all operations in the production of the chief crops.

A first prize of £1 and a second prize of 10/- were given for the best managed spring sown field, such as maize or sorghum, if 15 or more fields were shown in each group. Similar prizes were given in the lowlands for autumn sown crops, such as wheat, etc. In the mountain districts there was only one class, as all the crops, including wheat and maize, were spring sown.

Great keenness was shown in these competitions. A large number of the entries showed first-class management throughout. In some instances the owners had either bought superphosphate or manured their lands with kraal manure. Excellent crops of maize and sorghum were reaped on most of the lands entered.

Class B. (Sub-class I) (Lowlands).—Spring sown crops (Wheat). There were entries from 14 demonstration centres. Three hundred and fifty-five fields were shown and £19 5s. 0d. was awarded in prize money.

Class B. (Sub-class II) (Lowlands). Autumn sown crops (Wheat). Entries were received from 12 demonstration centres. Ninety-four fields were shown, and £14 awarded in prize money. Some excellent fields of wheat were shown. Some of the prize winning fields had been manured with superphosphate (200 lb. per acre) and had been planted early and grazed off several times with sheep.

Class B. (Sub-class III), (Mountain districts), (Wheat, maize and kaffir corn). One entry was received from one demonstration area in the Mokhotlong district. Seventeen fields were shown and £1 10s. 0d. awarded in prize money.

Class C.—Field Competitions for the production of high class seed.

Entries were received for this class from three demonstration centres. Sixty-eight fields were shown and £6 was expended in prize money. Some excellent fields of maize were shown in this class, but all the prizes were won by Natives showing fields of Manitoba wheat, which was of a very high quality. Wheat shown in this competition afterwards secured prizes at the Agricultural Shows.

Total prize money expended in the 1938-39 Crop Competitions was £40 15s. 0d.

Full particulars of the Crop Competitions and the scale of points to be used when judging the plots, etc., appeared in the Annual Report for 1938.

VEGETABLE GARDENING AND FRUIT CULTURE.

The Government's campaign to encourage the Basuto to lay out terraced vegetable gardens in their villages, with the provision of water conservation schemes and compost pits, is meeting with great success. Everywhere in the territory one now sees well laid out gardens. Even where there are no demonstrators stationed the people have profited by what they have seen elsewhere and have started vegetable gardening on their own. There are many who have beautiful gardens although these were not laid out under Government advice. It is difficult to estimate the number of such gardens, but at the present time there must be at least 3,000.

The appointment in May, 1939, of eight new demonstrators who have been stationed where their services are most required will help forward this project rapidly.

The Administration is encouraging the production of vegetables and fruit for the following purposes:—

(1) To obtain as much food as possible from a small area of ground.

(2) To provide a change and a better diet for the nation.

(3) As an anti-erosion measure.

(4) To teach the Native that much food can be obtained from apparently denuded useless ground in the villages if this ground is properly terraced.

These schemes were fully dealt with in the Annual Report for 1938.

The following vegetable seeds were given to all demonstrators for free issue to people starting gardens:—

7½ lb. Lucerne, 4½ lb. Cabbage, 2½ lb. Cauliflower, 5¾ lb. Carrot, 3¼ lb. Onion, 5½ lb. Swiss Chard, 8¾ lb. Swede Turnips, 2½ lb. Tomato and 1¼ lb. Hubbard Squash.

These were issued in the spring of 1938-39.

It has been decided that no issue of free seed will be made to Natives whose gardens were started more than three years ago. The people who have old-established gardens are joining together and buying seeds and fencing material co-operatively through their respective Agricultural Associations.

Lucerne planting on the terrace banks in the vegetable gardens is becoming quite a feature, and this crop is most useful for stock feed and for human consumption as spinach in the young stage.

Competitions were held all over the territory for the best laid out vegetable gardens which were provided with a water supply and facilities for the making of compost. Full particulars and a scale of points for judging these competitions are given in the Annual Report for 1937.

The judging of the various entries was an interesting but arduous undertaking, as so many of them were of a very high standard and so nearly equal.

The competition was divided into two classes, viz.: Class 1, for villages and Agricultural Associations entering at least 10 and under 20 gardens. Class 2, for those entering over 20 gardens.

There were 957 gardens shown under Class 1 and 1,976 under Class 2, making the total number of gardens shown in the 1938-39 competition 2,933, out of the total of 3,999, as against 1,625 shown in 1937-38.

An amount of £91 5s. 0d. was paid out in prize money for the 1938-39 Vegetable Garden Competitions.

List of Vegetable and Fruit Gardens in the Territory up to the 30th September, 1939, and in previous years.

District.	No. of gardens worked 1935/36	No. of gardens 1936/37	No. of gardens 1937/38	No. of gardens 1938/39	Increase from previous year.
Maseru	177	456	795	950	155
Mafeteng	192	317	523	576	53
Mohale's Hoek	114	186	199	333	134
Quthing	33	90	237	315	78
Teyateyaneng	50	57	83	148	65
Leribe, Butha Buthe & Peka	131	279	555	1,009	454
Qacha's Nek	125	339	485	580	95
Mokhotlong	15	50	50	88	38
Totals . . .	837	1,774	2,927	3,999	1,072

It will be noted from the above tabulated list that there were, on the 1st October, 1938, 2,927 properly laid out vegetable gardens which had been established under the advice and help of the Agricultural Department. At the end of September, 1939, there were 3,999, an increase of 1,072, which is very satisfactory. As has already been stated, it is estimated that there are at least an additional 3,000 gardens in the territory which have been laid out without the assistance of the Demonstrators.

Fruit trees, chiefly peaches, raised from seed in the Government nurseries, and also a small number of grape vines struck from cuttings, were issued in the late winter as a small reward to those Natives who had carried out the Department's advice when laying out their gardens, and who had also carried out the proper winter cultivation operations. A number of peach trees have also been planted on the contour banks which have been erected as part of the anti-soil erosion campaign.

Eleven thousand eight hundred and eighty-eight peach trees and 471 vines were distributed to owners of vegetable gardens, and 4,600 peach trees were planted on the contours. Twelve and a half bags of peach pips were issued for growth in the nurseries.

Markets for the disposal of surplus vegetables are held regularly at Leribe, Teyateyaneng, Maseru and Mafeteng.

Markets are also held from time to time at Butha Buthe, Mohale's Hoek and Quthing.

Good market shelters exist at Leribe and Mafeteng, and an excellent market building is in process of erection at Maseru.

Very fair prices have been obtained for vegetables at the various markets during the period under review. The provision of markets, and the decision of the Administration to buy direct from Native gardeners the vegetables required for gaol rations throughout the territory and also, in the Maseru district, the Leper Settlement's requirements, have greatly stimulated the growth of vegetables. Arrangements were made whereby the various Gardening Associations took it in turn to supply the vegetables.

The price paid by the Government for vegetables was: 1½d. per lb. for cabbages and 2d. per lb. for root crops. Thirteen thousand seven hundred and two lbs. of vegetables were supplied to the Government by the members of the Maseru Gardening Associations, and the sum of £84 14s. 6d. was paid out to the various members; £36 16s. 4d. was paid out to members of the Leribe Associations.

The vegetable classes at the various shows were well patronised, and this section was one of the best. Many of the exhibits were of a high order of merit.

PROTECTION OF THE FLORA AND FAUNA OF BASUTOLAND.

The protection of the Aloe Polyphylla and different varieties of the Gladiola afforded by the Resident Commissioner's Notice of the 20th September, 1938, which appeared in the Official Gazette 1938, dated the 30th September, 1938, has stopped the export of these flora except by permit. A survey was carried out of the known habitats of the Aloe Polyphylla in order to ascertain roughly the number of these aloes which still exist. It was estimated that there were approximately 750 specimens. Added to this number are a further 250 specimens which have been grown from seed by a trader in the Maseru District. Export of the latter is allowed only under permits issued by the Resident Commissioner.

PUBLICATIONS:

- | | |
|---|--|
| | (1) Winter Cereals Interim Report. |
| By Mr. H. C. Mundell,
Agricultural and Live-
stock Officer. | (2) Summer Cereals, Grasses, Trees
Interim Report |

PART III.

FINANCIAL STATEMENT.

REVENUE:

Nil.

EXPENDITURE:

£10,099 15s. 10d.

The period covered by this report is from the 1st October, 1938, to the 30th September, 1939, while the Financial year is from the 1st April, 1939, to the 31st March, 1940.

PART IV.

CONCLUSION.

I wish to tender my sincere thanks to my staff and colleagues for their assistance and loyal co-operation throughout the year.

(Sgd.) L. F. WACHER,

Agricultural Officer.

IMPORTED MANITOBA WHEAT ISSUES AND RETURNS, ETC., 1938/1939.

(ANNEXURE A.)

District.	Amount on hand 1938. In bags of 200 lb.	Amount issued 1938-39. In bags of 200 lb.	Amount which should have been returned 1939. In bags of 200 lb.	Amount actually returned 1939. In bags of 200 lb.	Total crop reaped from issue 1939. In bags.	No. of bags which should be returned from 1939-40 harvest, owing to partial failure of 1938-39 crop	Total amount of seed for re-issue in 1939-40. In bags.	Remarks.
Maseru	49	49	*49	47	313 $\frac{3}{4}$	—	47	No Manitoba wheat was issued in the lowlands for the 1938-1939 crop, as the previous crop was an entire failure. The results given are from the Setleketseng. *Allowed to give back one bag for one issued.
Mafeteng	41	41	82	77 $\frac{1}{2}$	614	—	119 $\frac{1}{2}$ *	A good crop was grown in the Mafeteng district, much of it excellent quality. *Includes 13 bags at Mafeteng not issued the year before and 29 bags returned in the Falls area. No particulars are available of crops reaped, as the demonstrator kept no records.
Mohale's Hoek	32 $\frac{3}{4}$	*29 $\frac{1}{2}$	59	39 $\frac{1}{2}$	219 $\frac{1}{2}$	—	39 $\frac{1}{2}$	*3 bags 50 lbs. destroyed by mice. A fair crop of wheat was obtained in this district.
Carried Forward	122 $\frac{3}{4}$	119 $\frac{1}{2}$	190	164	1,147 $\frac{1}{4}$	—	206	

(Continued Next Page.)

IMPORTED MANITOBA WHEAT ISSUES AND RETURNS, ETC. (ANNEXURE A Continued.)

(Continued from Previous Page.)

District.	Amount on hand 1938. bags of 200 lb.	Amount issued 1938-39. In bags of 200 lb.	Amount which should have been returned 1939. In bags of 200 lb.	Amount actually returned 1939. In bags of 200 lb.	Total crop reaped from issue 1939. In bags.	No. of bags which should be returned from 1939-40 harvest, owing to partial failure of 1938-39 crop.	Total amount of seed for re-issue in 1939-40. In bags.	Remarks.
Brought Forward	122 $\frac{3}{4}$	119 $\frac{1}{2}$	190	164	1,147 $\frac{1}{4}$	—	206	
Quthing	21	19 $\frac{1}{4}$	38 $\frac{1}{2}$	27 $\frac{1}{2}$	201	—	28 $\frac{1}{2}$ (includes 1 bag not issued.)	A fair crop of Manitoba wheat was grown in this district.
Teyateyaneng	3	3	6	2	5 $\frac{1}{2}$	—	2	The Manitoba wheat crop was poor in this district.
Leribe (including sub-districts of Peka and Butha Buthe)	8 $\frac{1}{2}$	8 $\frac{1}{2}$	17	14 $\frac{1}{2}$	37	—	14 $\frac{1}{2}$	No Manitoba wheat was grown in the Leribe demonstration area. The crop grown in the Peka & Butha Buthe area was poor.
Qacha's Nek (including sub-district of Mokhotlong)	60 $\frac{1}{2}$	55 $\frac{1}{2}$	111	67 $\frac{1}{2}$	182	—	72 $\frac{1}{2}$ (including 5 bags not issued.)	A fair crop was reaped. Unfortunately the entire crop in the demonstration area of Qacha's Nek was destroyed by hail, and that in the Mashai district was seriously damaged.
Totals.	215 $\frac{3}{4}$	205 $\frac{3}{4}$	362 $\frac{1}{2}$	275 $\frac{1}{2}$	1,572 $\frac{3}{4}$	—	320 $\frac{1}{2}$	

A total of 1,572 $\frac{3}{4}$ bags was harvested from 1,053 $\frac{3}{4}$ bags sown, and 320 $\frac{1}{2}$ bags were returned to the Government for re-issue. Although poor, the return of 7.64 bags from one sown is much better than last season's return, viz.: 2.95 to the one sown.

Unit of measure for wheat is—1 bag = 200 lb. The majority of the bags harvested were what are known as "machine filled bags," which, in the case of Manitoba wheat, average 250 lb. per bag.

**THE 1938/39 ISSUE OF MANITOBA WHEAT RETURNED TO
THE GOVERNMENT BY PRODUCERS IN 1939, PLUS MANITOBA
AND SPRING WHEAT GROWN ON SEED MULTIPLICATION
PLOTS.**

(ANNEXURE B.)

District.	Amount returned from 1938-39 issue, plus seed on hand from previous season.	Amount of seed grown on multiplication plots for re-issue.	Total.	Remarks.
Maseru	47	—	47	Re - issued in the Demonstration areas where produced.
Mafeteng	119½	—	119½	Ditto.
Mohale's Hoek	39½	—	39½	Ditto.
Quthing	28½	—	28½	Ditto.
Teyateyaneng	2	—	2	Ditto.
Leribe (including sub-districts of Peka and Butha Buthe)	14½	—	14½	Ditto.
Qacha's Nek (including sub-district of Mokhotlong)	72½	—	72½	Ditto.

WHEAT DEMONSTRATION PLOTS, SEASON 1938/39. (Results given in Machine Filled Bags of 250 lb.)
(ANNEXURE C.)

District.	Variety.	Demonstration Plots.			Native worked or Check Plots.		Remarks.
		No. of Plots.	Acreage	Yield per acre in bags.	No. of Plots.	Yield per acre in bags.	
Maseru	Mostly Manitoba Taalberg, Wolkoren, Red Egyptian and Bontaar.	43	130	3	42	140	1.5
							The wheat crop in the lowlands of the Maseru district was fair while that in the semi-mountain districts was not up to expectations due to rust caused by hail and excessive moisture.
Mafeteng	Chiefly Manitoba, Wolkoren and Union 52 and 27.	37	146	3.1	15	48	1.8
							The wheat crop was good in the Mafeteng district.
Mohale's Hoek	Manitoba and Basuto mixed wheat.	39	86	2	76	220	1.7
							Twenty Manitoba wheat plots in the Mpharane district. The wheat crop was fair in this district.
Quthing	Manitoba, Union 17 and Red Egyptian.	35	78.25	3.2	47	114	1
							The wheat crop was fair in the lowlands and good in the high-lands of the Quthing district.

WHEAT DEMONSTRATION PLOTS, SEASON 1938/39. (Results given in Machine Filled Bags of 250 lb.)
ANNEXURE C (Continued.)

District.	Demonstration Plots.			Native worked or Check Plots.		
	Variety.	No. of Plots.	Acreage per acre in bags.	Yield in bags.	No. of Plots.	Acreage per acre in bags.
Qacha's Nek (including sub-district of Mokhotlong)	Mostly Manitoba	23	47.5	5.4	19	38.5
						3.6
						The wheat crop was good in the Qacha's Nek district, except round Qacha's Nek and Mashal, where great damage was done by hail and untimely frost.
Teyateyaneng	Manitoba.	8	18	1.4	8	27.5
						1.5
						Wheat crop in this district not as good as in the previous year.
Leribe (including sub-districts of Peka and Butha Buthe)	Manitoba and Basuto mixed wheat.	39	118	3.1	14	40
						2.2
						There was practically no wheat grown in the Leribe demonstration area. A good crop was obtained in the Peka and Butha Buthe sub-districts. There were 22 plots of Manitoba wheat grown at Peka.

There were 20 plots which were complete failures in the Wheat demonstration work, comprising an area of 50.5 acres. The main causes of these failures were hail and untimely frosts when the wheat was blooming.

WHEAT DEMONSTRATION PLOTS AT MISSIONS.
(Results given in bags of 200 lb.)

No. of Plots.	Variety.	Total acreage.	Yield per acre	Remarks.
1	Manitoba	2	3.5	Grown at Roma after Potatoes.
1	Red Egyptian	6.75	2.75	Grown at Leloaleng.

All wheat sown in Demonstration Plots is treated, prior to being sown, with Copper Carbonate or Copper Sulphate as a preventive against smut. Good results have always been obtained from these treatments.

The Natives in the lowlands treat their wheat seed, as a preventive against smut, to a much larger extent than those in the mountain districts, and it is most noticeable how much more wheat in the mountain districts is affected by this disease. It is hoped to encourage more people to treat their seed.

MAIZE DEMONSTRATION PLOTS, SEASON 1938/39.
(Results given in bags of 200 lb.)

(ANNEXURE D.)

District.	Demonstration Plots.			Native worked or Check Plots.			Remarks
	No. of Plots.	Acreage	Yield per acre in bags.	No. of Plots.	Acreage	Yield per acre in bags.	
Maseru	31	104	5.9	34	113	2.3	The maize crop at the two demonstration centres in the mountains was an entire failure due to frost and snow in November. A fair crop was reaped in the lowlands where the land was properly cultivated.
Mafeteng	14	45.5	4.1	8	26.5	2.9	No maize demonstration plots were planted in the Se-monkong area. The maize crop was bad in the Molomo's Hoek area, and less maize than usual was planted in the Mafeteng district owing to the larger area planted to wheat.

Mohale's Hoek	27	57.5	2.6	30	108.5	1.2	The maize crop was very bad in the Mpharane district owing to damage by frost. A fair crop was reaped in the lowland portions of the district.
Quthing	37	154	4.3	43	135.25	2.7	A fair crop of maize was obtained. There were several outstanding maize demonstration plots in this district. One plot yielded 15 bags from 1.25 acres.
Teyateyaneng	3	12	5.7	3	10	5.4	The small number of maize demonstration plots worked in this area is due to the demonstrator being dismissed.
Qacha's Nek (including sub-district of Mokhotlong)	41	161.5	5.4	38	86.25	2.03	The maize crop was almost a failure in the Mashai and Mokhotlong areas due to frost, but outstanding crops were reaped in some of the other areas, especially Se-forong.
Leribe (including sub-districts of Peka and Butha Buthe)	76	212.5	5.9	33	82	2.1	The maize crop was poor in the Leribe district but much better in the sub-districts of Peka and Butha Buthe.

The majority of the maize demonstration work was outstanding, some of the plots giving a yield of up to 10 bags an acre. There were, however, 38 plots, comprising an area of 96½ acres, which were complete failures in the maize demonstration work. Most of these plots were situated in the foothill country and the failure was due to a very severe frost on the 25th November, 1938, and to early frosts in March, 1939.

MAIZE DEMONSTRATION PLOTS AT MISSIONS, SEASON 1938/39.

District.	Demonstration Plots.			Native worked or Check Plots.			Remarks	
	No. of Plots.	Acreage.	Yield per acre in bags.	No. of Plots.	Acreage.	Yield per acre in bags.		
Maseru {	Roma	5	23.75	7.7	6	18.5	3	These plots were well cultivated and all the plots received 200 lb. superphosphate per acre. Cut for silage. An excellent crop but too late to mature.
	Moriija	1	4	—	—	—	—	

SORGHUM DEMONSTRATION PLOTS, SEASON 1938/39.

(Results given in bags of 200 lb.)

ANNEXURE E.

District.	Demonstration Plots.			Native worked or Check Plots.			
	No. of Plots.	Acreage.	Yield per acre in bags.	No. of Plots.	Acreage.	Yield per acre in bags.	
Maseru	7	18	4.2	6	14.5	2.7	The sorghum crop in the semi-mountain demonstration areas was a complete failure. A fair crop was reaped in the low-lands.
Teyateyaneng	—	—	—	—	—	—	No sorghum demonstration plots were planted in this area owing to the dismissal of the demonstrator.
Leribe (including the sub-districts of Peka and Butha Buthe)	18	49	6	2	3	8	No sorghum plots in the Leribe demonstration areas. Excellent results were obtained from the demonstration plots at Peka and Butha Buthe.

Mafeteng	—	—	—	—	—	—	No sorghum demonstration plots in this area.
Mohale's Hoek	9	10	1.8	9	33	1	Most of the sorghum plots were at Mpharane and suffered serious damage from frost.
Quthing	16	66.25	3.6	16	62.25	2	The sorghum crop was fair in the lowlands of the Quthing district, but poor in the higher country.
Qacha's Nek	19	42.75	7	19	46	2.3	A good crop of sorghum was grown in the Orange River valley. Nearer Qacha's Nek the crop was killed by frost.
Mokhotlong)	—	—	—	—	—	—	A small amount of sorghum grown in the Orange River valley. All demonstration plots were total failures due to frost in November.

There were 17 plots, comprising an area of 32 acres, which were complete failures in the Sorghum demonstration work. The reason for these failures was the heavy frost which occurred on the 25th November, 1938.

**POTATO, PEA, RYE AND BEAN DEMONSTRATION PLOTS,
SEASON 1938/39.**

ANNEXURE F.

Crop.	Variety.	No. of Plots.	Acreage.	Yield per acre in bags.	Remarks
Potatoes	Chiefly Lord Roberts up to date.	6	7.75	44.7	The following are the results of the actual potato demonstration plots. More potatoes are being grown, chiefly in gardens. A record crop was grown at Roma, 250 bags on 2 acres. This land received a good dressing of kraal manure and 200 lb. of superphosphate.
Peas	Chiefly Basuto yellow peas and one plot of Black eyed Susan.	5	4.5	4.66	These pea demonstration plots were all planted in the lowlands and the crop reaped was a very fair one.
Beans	Cowpeas, Seven Year Beans and Canadian Wonder.	7	21	3.06	The season was not a good one for beans. Great damage was done to the blossom by the C.M.R. beetle. The excessive rainfall in January and February also seriously damaged the plants. The largest crop reaped was 5.75 bags per acre of Seven Year Beans at Leloa-leng.
Oats	Algerian.	1	2.5	2.000 bundles.	

Beans and Peas Unit of Measure: A bag = 200 lb.

Potatoes Unit of Measure: A bag = 150 lb.

The pea crop was very good in the mountain districts, but unfortunately there were no pea demonstration plots in these areas. There was a fair crop of peas in the lowlands, and all the demonstration plots were situated here. A number of small issues of peas and beans were made to Native gardeners, and fair crops of the Seven Year Beans were obtained. At the present time far more beans are grown in gardens than in field plots.

Heavy yields are obtained, as under good conditions the plant flowers about three times during the season.

The Native farmer is growing potatoes on a much larger scale than ever before. These are being grown in field plots as well as in the gardens. At Mohale's Hoek the Agricultural Officer secured 15 bags of seed potatoes for sale chiefly to members of the various Gardening Associations in his district.

ANNEXURE G.

COMPARATIVE MANURIAL TRIALS, 1938/39.

Results given in bags of 200 lb.

MAIZE:

Superphosphate.

Fifteen acre plots of maize, laid down on all types of ground throughout the territory, were manured at the rate of 200 lb. of Superphosphate per acre and average 6.5 bags per acre.

Sorghum: One six-acre plot of sorghum, manured at the same rate as the maize, yielded five bags per acre, while non-manured check plots yielded three bags per acre.

Wheat: One two-acre plot of wheat manured at the rate of 200 lb. of superphosphate per acre, yielded 4.5 bags per acre. The check plot in the same field yielded three bags per acre.

Maize: Eleven plots of 43.75 acres, at the various missions, were manured at the rate of 200 lb. of superphosphate per acre and average 8.4 bags per acre. Thirteen check plots of 22 acres yielded 5.7 bags.

Kraal Manure: A field of $2\frac{1}{2}$ acres manured at the rate of 10 tons per acre yielded 9.6 bags per acre. The acre check plot unmanured produced 2.7 bags per acre.

Kraal Ash: Five ten acre plots of maize received a dressing of Kraal Ash, varying from 3,000 to 5,000 lb. The average yield was five bags per acre. One acre of potatoes planted on very poor land, after receiving a heavy dressing of kraal ash, produced 26 bags.

No Manure: Fourteen check plots of 30 acres of maize yielded 2.6 bags per acre. (These are the check plots to the 15 plots mentioned in paragraph 1.)

The average production per acre, with the exception of the yields of mission plots, are greater than last year. This is accounted for by the fact that all the plots were well cultivated and kept clean of weeds. All lands which were so treated produced better crops than last season.

ENGINEERING SECTION.

ANTI-SOIL EROSION AND IRRIGATION WORKS.

PART I.

STAFF AND ORGANIZATION.

(1) STAFF:

E. R. Roberts, B.Sc., Civil Engineer:

W. K. Hudson, Surveyor.

Mr. Hudson, who was seconded in July, 1937, returned to the Public Works Department in July of this year as Surveyor of Bridle Paths.

The names of the eight Agricultural and Livestock Officers who are in charge of all anti-soil erosion operations in the field, and the Staff changes which have been made during the year, are recorded in the Agricultural Officer's report.

The Agricultural and Livestock Officer, Peka, Mr. F. O. A. Wande, was appointed during the year as Relieving Officer. Mr. Wande fills the vacancy created by the Surveyor's transfer to the Public Works Department.

Mr. I. L. Chard, who was appointed Agricultural and Livestock Officer in September, is at present stationed at Maseru, but will proceed to Peka to take over the Teyateyaneng District when the Relieving Officer is transferred to Maseru.

(2) ORGANISATION:

No essential change has been made during the year in the general organisation originally outlined in the report for the year ended 30th September, 1937.

The Relieving Officer, who has become proficient in the use of the tacheometer, will be closely connected with the activities of the Engineer's Office.

All field officers are now capable of making simple contour surveys with the Dumpy Level fitted with a horizontal circle. Such surveys, when deciding on the relative value of alternative dam sites, have proved of considerable value.

During the year a Relieving Foreman was appointed to take over from foremen proceeding on leave, as it was found inefficient to run a labour gang, even for a short period, without a European foreman in charge.

The training of foremen in the various aspects of the work was continued during the year, and at the end of September nine foremen had been promoted to the higher wage scale on account of their efficiency in the use of the level, in keeping the requisite books, in dam and terrace construction and in all other phases of soil conservation work in this territory.

PART II.**ANTI-EROSION WORK, PLANT AND GENERAL.****WORK DONE.****(1) Area Terraced and Terrace Bank Constructed.**

The following table gives the area reclaimed by terracing and the length of terrace bank completed in each district during the year.

District.	Area terraced: in acres.	Length of terrace completed: in yards.
Butha Buthe	664	90,950
Leribe	1,006	138,500
Teyateyaneng	3,667	435,190
Maseru (Reserve)	183	31,290
Maseru (Pack Saddle) . .	1,293	101,910
Maseru (Matsieng)	2,461	256,520
Mafeteng	2,746	259,100
Mohale's Hoek	1,727	180,990
Quthing	606	68,610
TOTAL	14,353	1,563,060

The amount of work completed in each district during the year was resultant on the period and conditions of working, the date of acquisition of suitable power plant, the supply of labour, etc.

(a) Area Terraced.

Area terraced during the year	14,353 acres.
Area previously terraced	27,556 acres.

Total area terraced 41,909 acres.

The figures given represent the actual area reclaimed by terracing and do not include the very considerable areas below the works, which are safeguarded from erosion by the terrace systems constructed above.

Over fifty per cent. of the area reclaimed during the year lay below fast, rocky catchments which necessitated the construction of heavy and costly intercepting works above the areas terraced.

All the areas worked suffered from sheet and gully erosion. Two small areas were so severely eroded that it is doubtful whether the actual value of the land warranted the high expenditure involved in reclamation. There can be no question, however, that these areas are of inestimable value in demonstrating to the people the benefits of the work, and in this way obtaining the goodwill and co-operation of the Native landholders, which is so vital to the smooth execution of the soil conservation programme.

(b) Length of terrace bank constructed.

Length of terrace bank constructed during the year	1,563,060 yards.
Length of terrace bank previously constructed	2,937,580 yards.
Total length of bank constructed	4,500,640 yards.

The figure for the length of terrace constructed during the year does not include the many thousands of yards of partially completed work which has been cut by plant, but which still requires the raising of the banks at gully crossings by scrapers or hand work.

Over 1,900,000 cubic yards of earth was moved in constructing the 1,563,060 yards, or approximately 890 miles of terrace. This represents a mean content of 1.22 cubic yards per linear yard of bank as compared with last year's figure of 0.99. The increase in the mean content figure was due to the many thousands of yards of heavy training bank that had to be constructed below steep catchments, and to the general construction of a slightly wider and therefore more stable terrace than hitherto.

The dimensions of the terrace, standardised as being the most suitable under existing conditions, are:—

	ft.	in.
Base width	14	0
Height at centre (above original ground level) . .	1	4
Width of upper furrow	2	9
Width of lower furrow	1	0

The value of a clean, wide, upper furrow and gently sloping bank has been proved repeatedly.

The layout of terrace systems has, in general, been good, a greater factor of safety being given than in previous years.

(c) Unit costs.

Area: The mean unit cost of all anti-erosion work completed in the territory during the year was 15.95 shillings per acre.

This figure includes supervision and transport expenditure, running costs of power plant, cost of labour, etc., in all the various works, such as terracing, tree-planting, dam construction, etc., but excludes overhead departmental expenditure and depreciation on plant and equipment.

The unit cost is 1.37 shillings per acre higher than last year, but must be considered satisfactory in view of the high expenditure that was necessary in the reclamation of several excessively eroded areas, and also in view of the considerable amount of work done in tree-planting and fencing during the year.

Terraces. The mean unit costs for the total length of terrace completed during the year were:—

8.12 shillings per 100 yards of completed terrace.
0.67 shillings per 10 cubic yards of earth shifted.

These costs include cost of labour, running expenses of plant, cost of feed for oxen, etc., but exclude cost of supervision

by officers, transport expenses and overhead departmental expenses.

Training banks are included in the calculation of unit costs of terraces.

The mean unit costs of terrace construction show such an appreciable reduction over those for previous years. The reduction in working costs is due to the increased experience of officers, resulting in more efficient organisation of labour and of construction of terraces by plant.

(2) Weirs.

Number of weirs constructed during the year: 1.

As stated in last year's report, the construction of weirs, whether of masonry, stone in wire, or concrete, is not favoured unless no practical alternative exists. This applies to structures for the disposal of excess water from terrace systems into main drainage lines.

In only one case this year was the construction of a weir considered necessary. This structure is of stone in wire and is situated across the gully at the inlet of the large dam constructed last year to irrigate the additional multiplication plots on the Maseru Reserve. The purpose of the weir is to divert the flood waters over pasture before entering the dam, and thus to minimise silting, which, previous to construction of the weir, was rapid.

As regards the disposal into selected drainage lines of excess water from terrace systems or of flood waters from dams, masonry and concrete structures have been superseded by grass inlets which can be established at a fraction of the initial cost and are easily maintained.

(3) Grass Inlets and Meadow Strips.

Number of grass inlets constructed during the year: 26.

Number of meadow strips established during the year: 3.

Construction of grass inlets was continued on the general lines mentioned in the previous report.

The use of grass instead of stone continues to prove successful when constructing a means of disposing of excess water from terrace systems. Inlets which have been established for three years and have had to withstand considerable velocities of water, have resisted the strain remarkably well, and little maintenance has been necessary. In one instance, for a short period a grass inlet successfully handled water with an estimated maximum velocity of 18 ft./sec.

It therefore appears that a correctly constructed grass inlet is an efficient, permanent disposal measure, with a greater factor of safety than was at first thought. For the inlet to be permanent, however, the dense vegetative cover must be maintained. Many of the inlets constructed during the year were fertilized in order to accelerate the thorough establishment of the grass cover.

In general, Kikuyu has proved the most suitable grass for sodding of grass inlets and waterways in this country. In dry situations a little *Eragrostis curvula* has tended to creep into the stands of Kikuyu, while in very wet places a fair amount of *Agrostis lachnantha* is to be seen amongst the Kikuyu, but in

no case is there any evidence that the Kikuyu is being ousted by other grasses.

Cynodon dactylon has proved successful under dry conditions, but in wet situations has been replaced almost entirely by *Agrostis lachnantha*.

Rooiwater kweek (*Hemarthria fasciculata*) although not extensively tested, has proved satisfactory for grass inlets subjected to almost permanent flows. Its establishment, however, is slower than Kikuyu.

As regards the maintenance of the vegetative cover of grass inlets and meadow strips, controlled grazing is desirable to prevent the grasses from becoming matted, with resultant deterioration of the under growth. A healthy condition of the vegetative cover should at all times be maintained by controlled grazing, cutting or even by burning at suitable periods; the last method being the least desirable.

Little opposition was encountered to the enclosing of the three areas established as meadow strips during the year, in spite of these areas being situated in the midst of cultivated lands. The three areas are now well established to grass and will make valuable winter grazing.

As pointed out in last year's report, the establishment of meadow strips in cultivated lands is considered an essential measure in the control and cure of soil erosion in Basutoland.

(4) Dams Constructed.

Dam construction forms an integral part of the soil conservation programme in Basutoland. In addition to slowing up and conserving excess water from terrace systems, dams have considerably reduced trampling of pasture and the creation of cattle paths by providing convenient drinking places for stock. In general, a dam is constructed in each valley or minor watershed, the distance between major dams being, as a rule, about four miles. After rain, however, numerous small drinking places are available in areas terraced, due to the accumulation of water behind gully banks and at points where small depressions are crossed by terraces.

The provision of convenient drinking places for stock has greatly assisted in the smooth progress of soil conservation work by obtaining the goodwill and support of the Chiefs and people who now frequently ask for various erosion control measures to be undertaken in their areas.

A number of the large dams have been stocked with black bass which appear to be doing well, and it is a pleasure to record that numerous varieties of birds, notably wild duck, are taking advantage of the dams and reclaimed vleis as nesting and feeding grounds.

The standard of dam construction during the year has been good. Embankments have been well consolidated during construction and greater experience by the European foremen has resulted in embankments being built with even and neat slopes. The design and construction of spillways has also been satisfactory, a greater discharge per square mile of catchment being provided for.

With the exception of three of the smaller of the fifteen dams constructed during the year, dam embankments have been

fenced to prevent damage by grazing to the vegetative cover established on the embankments. In the few cases where the dam basin itself has been enclosed, a lane to the water has been left for the watering of stock.

The planting of Kikuyu on the upstream slope of dam embankments is proving a successful method of protecting embankments against wave action and erosion by rain. The growth of the Kikuyu in such moist situations is usually good. Initial establishment of the grass is greatly assisted by fertilizing or by spreading a layer of good soil over the finished embankment. Runners of Kikuyu, with a length as great as thirty feet, are to be seen lying on the water surface of numerous of the older dams, effectively blanketing wave action; runners of ten feet are common.

Cynodon dactylon is frequently used for protecting the downstream slope of dam embankments owing to its tenacity under dry conditions.

(a) **Number constructed.**

Number of dams constructed during the year ..	15
Number of dams previously constructed	49
Total number of dams constructed	64

In addition to the fifteen major dams constructed during the year, a considerable number of small dams, formed by water being retained behind gully crossings, were built.

(b) **Principal dams.**

The most important dam constructed during the year is situated in the Butha Buthe district. Although of only three million gallon capacity it will prove of considerable service in supplementing the supply of water of an old established dam for irrigating the new multiplication plots at Butha Buthe.

By utilising the bed of an old vlei in the Maseru district, an economical dam of well over thirteen million gallons was constructed, and a large valuable area protected thereby.

In the Mafeteng district, which contains the driest areas in Basutoland, four greatly needed stock dams were constructed. One of these dams has a capacity of over six and a third million gallons, while another has nearly three million gallons.

(c) **Total capacity.**

The total amount of water impounded at full supply level by the fifteen major dams constructed during the year is twenty-nine and a third million gallons.

(d) **Unit costs.**

The unit costs of construction varied considerably. The following are the mean unit costs:—

Cost per 1,000 gallons of water impounded	0.57 shillings.
Cost per 10 cubic yards of embankment ..	4.14 shillings.

These costs include labour and supervision, tractor expenses, feed for oxen, etc., but exclude overhead departmental expenses, depreciation on plant, implements, etc.

The unit cost of embankment content for the year shows a decrease of almost one shilling per 10 cubic yards over last year's figure.

(5) Multiplication Plots.

Three additional areas were enclosed during the year, and the ground prepared for the multiplication of trees and grasses. In two districts the facilities for irrigating the multiplication plots were greatly improved.

In spite of spells of unfavourable weather during the year, work on the propagation and multiplication of trees and grasses has, in general, proved most successful, and all plots have now large quantities of trees and grass from which to draw.

Investigation work on the suitability of various trees and grasses for erosion control was continued throughout the year at the Maseru experimental plots.

Grasses. Kikuyu continues to take pride of place of all grasses yet tried for soil conservation work in this country. It is perennial and of rapid growth, and, in general, has withstood frost and drought unexpectedly well. Each multiplication plot has now a fair sized area under Kikuyu from which supplies can be drawn for planting out on gully banks, training banks and dam embankments.

Cynodon dactylon has also proved satisfactory and is especially useful in dry localities.

Experiments aiming at the establishment of a vegetative cover from seed have been carried out with numerous varieties of grasses, but field trials have proved disappointing. *Setaria phacelata* is the most promising of the varieties yet tried.

The establishment of *Hyparrhenia* (thatching grass) from seed has not proved successful. Experimental work, however, is being continued.

Successful sowings of the indigenous blue grass (*Panicum laevifolium*) have been recorded, but unfortunately it is not a perennial grass and affords only temporary, although useful, cover.

Amongst the more important of the numerous experiments carried out at the Maseru experimental plots during the year, was the work on ten varieties of imported clover to determine the most suitable for Basutoland conditions.

The clover experiments, it is hoped, are a preliminary to propagating clover seed on an extensive scale, firstly at Maseru and later in all districts, in order that large quantities of seed of the most suitable varieties may readily be available for use in connection with soil conservation work.

In general, the establishment of a vegetative cover from seed has not proved successful owing to the excessive grazing to which such cover on training banks and terraces is subjected. As mentioned in last year's report, steps are being taken to prevent grazing of banks in cultivated lands during the period September to May of each year.

Trees. Of the numerous varieties of trees as yet tried for erosion control in this country, *Robinia pseudo-acacia* and the local poplar, *P. canescens*, continue to prove the most suitable.

Large numbers of *Robinias* were raised from seed in all multiplication plots, and considerable quantities are now available for planting out.

Young saplings of the local poplar are readily available in all districts and are taken from poplar bushes close to the areas being planted.

Peach trees were also raised on an extensive scale in all multiplication plots during the year.

In addition, numerous other varieties of trees, notably *Gleditsia triacanthos*, were raised but not on such an extensive scale as *Robinia* and peach trees.

Several varieties of elm and poplar are being tested in the Maseru district with apparent success. *Populus macrophylla*, it is thought, will prove a useful timber tree for planting, interspersed among *Robinias* in plantations; unfortunately it does not appear to withstand severe drought.

(6) Planting and Sowing of Banks.

The planting of gully banks and dam embankments, and the planting and sowing of terraces, has been continued during the year in order that a vegetative cover may quickly become established on all banks as a protection against the scouring action of rain and surface waters, and damage by stock.

It has been decided that owing to the comparatively high cost of planting, only dam embankments, training banks and other major works on which the quick establishment of a vegetative cover is essential, would in future be planted; standard terrace would not be planted but might be sown to clover, setaria or blue grass.

Investigations to determine the effectiveness of grass buffer strips as erosion checks are being continued, but it is as yet too early for any definite conclusions to be drawn.

Pasture areas.

In pasture areas, hardy perennial grasses, which are palatable to stock, have been planted.

(i) Approximately 108,000 yards of terrace bank was planted during the year to the local Couch grass (*Cynodon dactylon*) and openings in this length of bank were sodded. Numerous gully banks were also sodded with *Cynodon*. Establishment has been good.

(ii) Over 69,000 yards of terrace and training bank was planted to Kikuyu which, in most localities, has become quickly established. In addition, large numbers of gully banks and all dam embankments were sodded to Kikuyu. Deep planting of Kikuyu in Winter was tried during the year and proved partially successful.

Cultivated areas.

Grasses which are difficult to eradicate are not planted on terraces in cultivated lands.

(i) Approximately 331,000 yards of terrace was sown to lucerne and clover during the year. In spite of intensive grazing at much too early a stage in the plants' growth, a fair proportion of the lucerne and clover has become established. An especially fine stand of clover is to be seen in the Quthing district.

(ii) The planting of *Hyparrhenia* roots (thatching grass) on terrace banks was continued during the year, and a total of 104,000 yards was planted. Thatching grass planted in previous years has done well, especially in wet, heavy soil conditions.

(7) Tree Planting.

Number of trees planted during the year ..	232,700
Number of trees previously planted	171,960
Total number of trees planted	404,660

As mentioned in a previous report, the planting of trees is one of the principal anti-soil erosion measures being carried out in this country. By the establishment of large numbers of trees, denuded areas and gullies are being reclaimed, and considerable quantities of wood, of which there is a keen shortage in Basutoland, will eventually become available to the people. The provision of wood will ultimately lead to the release of cattle dung for fertilizer instead of fuel, with resultant increase in the fertility of the lands and their resistance to erosion.

Plantations are established on areas suffering from severe denudation and gully erosion. The planting of gullies will be intensified as soon as the administrative measures for the control of grazing in gullies have been completed.

As is shown by the figures given above, tree planting has been greatly intensified during the year. To a large extent this has been made possible by the people now approving instead of objecting to tree planting. As a consequence, sufficient numbers of trees, principally *Robinia pseudo-acacia*, have been raised in all district multiplication plots. Of the total number of trees planted during the year 94,000 were Robinias.

Approximately 72,000 poplars and 35,000 gums were planted, these figures being included in the total given. The remainder was composed of comparatively small numbers of a considerable variety of trees which included peach trees, of which nearly 3,000 were planted, pines, willows, honey-locusts, oaks and elms.

At the recent Conference of the Agricultural Department it was decided that future plantings will be composed mainly of Robinias and the local poplar, as, up to the present, these have proved the most suitable trees for soil conservation work in this country. Other varieties of trees may be planted if readily available but the importation of trees will be limited to those for experimental purposes.

It was also laid down that instead of employing a special tree planting gang throughout the planting season, as has been done in the past, the major part of the main soil conservation gang in each area will, in future, be employed on tree planting during a period in the Spring and again during a period in the late Summer. The times of planting and the lengths of the planting periods will, of course, depend on weather conditions in each area. It is considered that by concentrating the work of tree planting in this way increased efficiency and appreciable reduction in the cost of planting will result.

In general, the establishment of trees planted during the year has been good. Rats were troublesome in certain localities, especially in overgrown areas, and did appreciable damage by barking young trees. Trees planted in previous years continue to make good growth, and well established plantations are now to be seen in all districts. In addition to their being a direct soil conservation measure, plantation enclosures provide valuable and greatly needed Winter pasture. These enclosures are grazed annually during the dry season as soon as the young

trees have become thoroughly established, in order that the danger of fire may be minimised.

(8) Fencing.

The area fenced in connection with soil conservation work in the territory is as follows:—

Area fenced during the year	936½ acres.
Area previously fenced	653½ acres.

Total area fenced	1,590 acres.
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In addition to the 936½ acres fenced during the year, numerous dam embankments and grass inlets were protected by the erection of fencing.

The total area fenced during the year is composed of eighteen separate areas all suffering from severe sheet and gully erosion. Two of the areas in particular form such a striking and dreadful picture, on account of complete denudation and inter-linked gully erosion, that they are known throughout Basutoland, and give an insight of what the future condition of large tracts of this country would have been had soil conservation measures not been taken. In addition to their ultimate intrinsic value, these areas, which have been fenced and planted to trees, will undoubtedly prove of considerable benefit as demonstration areas.

Owing to the cost of fencing, which is high under normal conditions and is rapidly becoming excessive on account of the war, the introduction of administrative measures is being considered whereby any denuded areas would be beaconed off by officers of the Department and would be proclaimed "protected areas." These areas would be regarded exactly as if they were fenced, in that they would be planted to trees, and grazing would be strictly controlled. The saving in expenditure by the establishment of protected areas instead of fenced areas would be considerable.

(9) Maintenance.

Appreciable damage to newly constructed terrace systems was done by severe storms in several areas during the year. A portion of the Mafeteng district where terrace construction was being carried out, experienced a cloudburst early in the year. The storm was so intense that the Likhoele stream, which is a fair-sized river when in spate, jumped its banks at a turn and washed away roads, lands and a considerable length of newly constructed terrace. Terraces which had become established, however, withstood the strain of the flood waters extremely well and played an effective part in slowing down and disposing of the flood.

Maintenance of the older terrace systems has been surprisingly small. Local breaks in a few of the systems have occurred as a result of heavy storms, and a certain amount of damage was done by stock trampling down terraces not fully protected by a vegetative cover. The accumulation of silt in terrace furrows has also proved a problem in certain areas, but in view of the large area already reclaimed, the year's expenditure on maintaining established terrace systems has been remarkably low.

A considerable portion of the year's total maintenance expenditure was incurred in the inspection of terrace systems.

Frequent inspection is necessary in order that any minor damage, such as local breaks, accumulations of silt in the terrace furrows, etc., may be detected and rectified before more extensive damage results. In order to reduce the costs of inspecting and maintaining the 2,500 miles odd of terrace completed to date, selected Native labourers have been appointed, each of whom is responsible for the inspection of approximately two thousand acres of land reclaimed by terracing. They repair all minor faults and attend to plantations, etc., and any serious damage to terrace systems is reported. In addition, they instruct the people in the correct method of ploughing between terraces. When a reclaimed area is eventually handed over to the people, who will then be responsible for maintaining the works in that area, the maintenance labourers will be retained for one year to work in co-operation with the chief and people.

TRACTION AND PLANT.

(1) Animal Traction.

Oxen are used for the construction of small gully banks, the cutting of openings in terraces in pasture areas, and as an adjunct to power plant in the various other phases of construction.

It has been found that the minimum number of oxen, consistent with efficiency, is thirty oxen per district when ample grazing is available, or thirty-six per district when grazing is scarce. The additional number will allow of the oxen being rested in rotation.

(2) Plant.

Heavy plant purchased during the year:—

4 Caterpillar D6 tractors.

Heavy plant previously purchased:—

3 Caterpillar RD4 tractors.

1 Caterpillar No. 22 tractor.

4 Fowler 4/40 tractors.

2 Caterpillar No. 22 graders.

1 Caterpillar No. 33 grader.

4 Sawyer Massey Imperial 16 graders.

Ploughs:

After extensive trials of various makes of plough, a Ransome's Solotrac T.S.I.E. plough was purchased last year for each district.

Harrows:

Ransome's flexible steel harrows and Parmiter chain harrows continue to prove satisfactory for the smoothing of terrace banks after construction.

Ditchers:

The ditcher in general use for terrace construction in Basutoland is the improved Eaton ditcher.

Graders:

The Caterpillar graders continue to prove satisfactory, but it has become evident that the No. 33 grader is a far more

suitable machine than the No. 22 for use behind the Caterpillar RD4 tractor on the arduous work of terrace construction in this country.

The Sawyer Massey Imperial 16 graders are doing excellent work behind the Caterpillar D6 tractors.

Tractors:

The three Caterpillar RD4 tractors continued to do good work during the year. Repair expenditure showed a slight increase over that for last year. A complete engine overhaul of two of the machines was carried out in February.

Repair expenditure on the Caterpillar No. 22 tractor also showed an increase; its fuel and oil consumption, however, remained remarkably steady.

In August a Caterpillar D6 tractor was obtained on trial and carefully prepared tests were carried out at Peka. A comparative trial was held between the Caterpillar RD4 and No. 22 grader combine and the Caterpillar D6 and Sawyer Massey Imperial 16 grader combine. The latter definitely proved the more efficient unit for terrace construction in this country. The most valuable figure obtained from the trial was that construction of the standard terrace with the D6 and Imperial 16 combine was 0.2 shillings per 100 yards of bank less than with the RD4 and No. 22 grader combine. This figure is based on the total running costs which include costs of fuel and oils, estimated repair expenditure, depreciation of plant, and wages of plant operators. It is thought that this saving is on the low side as the D6 had not been fully run-in at the time of the trial and a generous allowance was made for repair expenditure, but even at this figure a saving of approximately £90 per tractor unit per year will be effected in the costs of construction.

As a result of the trials four Caterpillar D6 tractors were purchased.

Fuel Consumption and Running Costs:

Caterpillar RD4 tractors:

Total number of hours worked by the three tractors during the year	4,725 hours.
Mean fuel consumption (Diesel Fuel)	1.36 gallons per hour.
Mean running cost (fuel, oils, repairs, overhaul expenditure, etc.)	3.80 shillings per hour.
Mean total cost (inclusive of depreciation, but exclusive of wages of plant operators)	4.95 shillings per hour.

Caterpillar No. 22 tractor:

Total number of hours worked by the tractor during the year	1,419 hours.
Mean fuel consumption (petrol)	1.44 gallons per hour.
Mean running cost (fuel, oils, repairs, overhaul expenditure, etc.)	3.98 shillings per hour.
Mean total cost (inclusive of depreciation, but exclusive of wages of plant operators)	4.62 shillings per hour.

The mean running costs given above agree closely with those for last year.

The running costs of the Caterpillar D6 tractors are not given owing to the short period for which these machines have been employed in the territory.

IRRIGATION.

Owing to the outbreak of war, all work connected with the proposed construction of six irrigation schemes has been suspended.

GENERAL.

(1) Survey.

A check survey of all areas reclaimed by terracing up to the end of September, 1938, was made by the Surveyor. The figure given in last year's report for the total area reclaimed, which was compiled from District Officers' returns, agreed sufficiently accurately with the actual figure given by the survey that adjustment was unnecessary.

(2) Publications.

The first of a series of articles entitled "What the Agricultural Department is doing in Basutoland," written by the Engineer, was published in the October issue of the Teachers' Magazine of the Basutoland Education Department. The articles briefly outline the aims of the nine principal schemes being carried out by the Agricultural Department, and emphasise the benefits that the people will receive from the schemes. It is hoped that by the publication of these articles, the native teachers will receive and will impart to the children a fuller understanding of the policy of the Department, and that this will greatly assist in furthering the progress of the various schemes by obtaining closer co-operation of the people.

(3) Visitors.

His Excellency the High Commissioner inspected the soil conservation works in the Pack Saddle area in January.

In June, His Grace the Duke of Devonshire paid a short visit to Matsieng and inspected a portion of the works in that area.

In addition, numerous other visitors, several of whom represented other dependencies, were shown over the soil conservation works during the year and studied the methods employed.

(4) Conference.

The Annual Conference of the Agricultural Department was held in Maseru on the 26th September, 1939.

The Conference proved extremely valuable and various measures were advocated whereby soil conservation work in the territory would be facilitated.

The economic aspect of reclamation by terracing was discussed, and it was agreed that as sufficient demonstration work on excessively steep and severely eroded catchment areas had been completed in all districts, terrace construction would, in future, be confined to the valuable, extensively cultivated, rolling country, suffering from sheet and incipient gully erosion, which

could economically be reclaimed by terracing. Excessively steep, eroded catchments will be disposed of on the most economic lines by pasture management, tree planting in beaconed areas, etc.

Other principal measures agreed on by the Conference have been mentioned earlier in this report.

(5) Re-allocation of Lands.

Re-allocation of cultivated lands on the Mohales Hoek Reserve was undertaken during the year. After a survey had been made, a plan of the Reserve was prepared dividing it into areas that could safely be cultivated without danger of erosion and into areas that should be reserved for grazing. A complete and convenient lay-out of the area that could safely be cultivated was prepared, individual lands being marked out between terraces. The lands, all of which had been taken away from native landholders, were then re-issued in accordance with the layout, while surplus cultivated lands on excessively steep slopes were retired to pasture.

The action taken at Mohale's Hoek, in addition to benefiting the Reserve and the landholders concerned, will undoubtedly prove of great value to the soil conservation scheme as a whole by providing a striking demonstration of the benefits of the scheme.

Contour Ploughing.

The important part played by correct methods of cultivation in preventing soil loss are shown by experiments carried out in the United States of America, at Bethany, Missouri. The experiments, which extended over a period of three years, revealed that with ordinary methods of straight line ploughing soil loss amounted to 68 tons per acre, whereas with contour cultivation soil loss was reduced to 19 tons per acre. Where contour cultivation was supported by terraces, the loss of soil was only 2 tons per acre.

In this country terrace construction, assisted by propaganda and demonstration work, has resulted in contour ploughing between terraces being generally practised. Rare cases have occurred where fields have been ploughed up and down the slope with resultant injury to terraces. Thus in cultivated areas which have been terraced, soil loss has been reduced to a very small figure.

Terrace systems in Basutoland, however, have not been designed to withstand exceptionally high intensities of rainfall, as it was evident at the outset that it would be more economical to repair terrace systems occasionally than to construct systems which could withstand very exceptional storms. Any measure which would advantageously affect the permanence of terrace systems and increase their water handling capacity was, therefore, of major importance; and, of the various measures investigated, contour ploughing to a definite system was found to be by far the most valuable.

Numerous systems of contour ploughing have been investigated in order to determine the method that will have the greatest effect in increasing the stability of terrace systems and in reducing the loss of soil and water to a minimum by altering the ground conformity between terraces. Any system considered had to be simple in order that it might be easily understood and carried out by the native people.

Investigation work is continuing, but the following system appears the most effective and is being advocated to the people:

Considering an area between two standard narrow-base terraces, ploughing is commenced at a distance of five paces from the edge of the main furrow of the lower terrace, and a strip thirty feet wide is contour ploughed in a clockwise direction to form a plough bank which thus runs parallel with and at a distance of five paces from the edge of the furrow of the lower terrace. A strip of thirty feet was decided on as being sufficiently wide for convenience in ploughing and yet narrow enough to allow of the construction of the plough bank at a fixed distance from the terrace to be gauged reasonably accurately. The remaining area is then divided and contour ploughed. The manner in which this is divided and the number of divisions is unimportant provided that the uppermost strip is ploughed so that the earth is thrown against the backslope of the upper terrace.

By means of this system of ploughing, the width and capacity of the terrace furrows and the stability of the terrace banks are gradually increased by each ploughing. Successive ploughing by this system will also tend to build up a ground conformity between existing narrow base terraces which will eventually resemble a bench terrace with a slightly hollow bed and a long, sloping face. Where the ground slope is constant and the terraces parallel, the grade of the so-called bench terrace will approximate closely to that of the narrow base terraces between which it has been formed.

The plough bank, constructed in the first place five paces from the edge of the main furrow of the narrow-base terrace, will gradually be built up by successive ploughings and will form a lip to the bench terrace with a crest appreciably higher than the bed of the bench. This bank, or lip, will hold back extremely large quantities of water on the so-called bench terrace and will prevent erosion of the bench. The danger of waterlogging, which in any case is not a very real one in this country, will be avoided as the bench terraces will be on grade and any water which is not absorbed will be disposed of at the outlet of the narrow base terraces.

Tests are being carried out by alternately ploughing and consolidating earth with a heavy roller in order to determine the rate with which the ground conformity will be changed by successive ploughings.

The general and immediate adoption of this system of contour ploughing is of the utmost importance in order that the permanence of terrace systems in cultivated lands may be assured and that water and soil losses may be reduced to an absolute minimum.

PROGRESS OF WORK.

At the commencement of soil conservation work in the territory numerous difficulties existed, several of which appeared insurmountable. A large scale programme was to be started of work embracing numerous principles and methods of procedure, concerning which little applicable information could be obtained from any source. The programme was to be carried out under conditions that varied greatly and whose effect on the work could not be accurately foreseen.

By the end of 1936, sufficient staff had been appointed for the work to be carried out on the scale anticipated.

The clear-cut policy of the Department and the thorough organisation of the staff, prevented any serious mistakes being made at the outset of work. The valuable co-operation given by the various other departments and by the Paramount Chief, greatly assisted in overcoming many of the initial difficulties and in furthering the progress of the work.

More efficient methods of procedure were evolved as time went on as a result of experience gained and of the intensive investigation that was made in all phases of erosion control.

The suspicion with which any new work in a native area is greeted by the people has gradually given way to a feeling of confidence which is growing as the benefits of the work become more apparent.

Thus, all phases of erosion control are now being carried out more smoothly and with greater efficiency. Numerous difficulties still remain, but measures are being taken to overcome or circumvent them.

In the three years since the commencement of work nearly 42,000 acres of land have been reclaimed by terracing, 1,590 acres have been protected by fencing, over 404,000 trees have been planted and 64 large dams, with a total full supply capacity of approximately one hundred million gallons, have been constructed. In addition, large numbers of grass inlets and meadow strips have been established and many hundred of thousands of yards of terrace has been planted or sown to valuable grasses.

These are the visible results of the work completed in the three years of which the benefits have already become apparent, but the figures do not show the great amount of work that has been done in testing various methods of construction, in determining the most efficient power plant, in carrying out trials with numerous varieties of trees and grasses and in investigating many other aspects of soil conservation, nor do they show the progress that has been achieved in obtaining the goodwill and co-operation of the native people.

PART III.

FINANCIAL STATEMENT.

The sum of £160,223 from the Colonial Development Fund became available on the 1st October, 1936, for anti-soil erosion work in this territory.

Revenue for the year	£139
Expenditure for the year	£23,358

The above expenditure includes the amount expended on the purchase of plant.

The period covered by this report is from the 1st October, 1938, to the 30th September, 1939.

PART IV.

LEGISLATIVE CHANGES.

During the period under review there have been no legislative changes affecting soil conservation work in the territory.

(Signed) E. R. ROBERTS,
Engineer to Agricultural Department.

